FRITZ J. FRANK
President

J. H. VAN DEVENTER
Editor

C. E. WRIGHT, *Managing Editor* — J. A. ROWAN, *News Editor* — A. I. FINDLEY, *Editor Emeritus*

R. E. MILLER, *Machinery Editor* — F. J. WINTERS, *Art Editor* — T. W. LIPPERT, *Metallurgical Editor*

Associate Editors
F. J. OLIVER — W. A. PHAIR — G. RICCIARDI

Washington Editor
L. W. MOFFETT

Resident District Editors
T. C. CAMPBELL, *Pittsburgh* — ROBERT C. BINGHAM, *Chicago*
D. R. JAMES, *Cleveland* — W. F. SHERMAN, *Detroit*

Editorial Correspondents
F. B. RICE-OXLEY, *London, England* — ROBERT G. McINTOSH, *Cincinnati*
G. FRAZAR, *Boston* — P. FIDRMUC, *Hamburg, Germany*
C. F. MEYER, *Milwaukee* — CHARLES POST, *San Francisco*
F. SANDERSON, *Toronto, Ontario* — ASA ROUNTREE, JR., *Birmingham*
LEROY W. ALLISON, *Newark, N. J.* — ROY M. EDMONDS, *St. Louis*
F. T. TURNER, JR., *Buffalo*

★

Owned and Published by

CHILTON COMPANY
(Incorporated)

Publication Office	Editorial and Executive Offices
Chestnut and 56th Sts., Philadelphia, Pa.	239 West 39th St. New York, N. Y.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*
FRITZ J. FRANK, Executive Vice-President
FREDERIC C. STEVENS, Vice-President
JOSEPH S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JOHN H. VAN DEVENTER, JULIAN CHASE, THOMAS L. KANE, CHARLES S. BAUR, G. CARROLL BUZBY, P. M. FAHRENDORF

★

C. S. BAUR, *General Advertising Manager*
A. H. DIX, *Manager Reader Service*

Member, Audit Bureau of Circulations
Member Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents. Cable Address, "Ironage, N. Y."

ADVERTISING STAFF
Emerson Findley, 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Phila.
H. K. Hottenstein, 1012 Otis Bldg., Chicago
H. E. Leonard, 239 W. 39th St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, W. J. Fitzgerald, 428 Park Bldg., Pitts.
D. C. Warren, P. O. Box 81, Hartford, Conn.
Don F. Harner, 1595 Pacific Avenue, Long Beach, Cal.

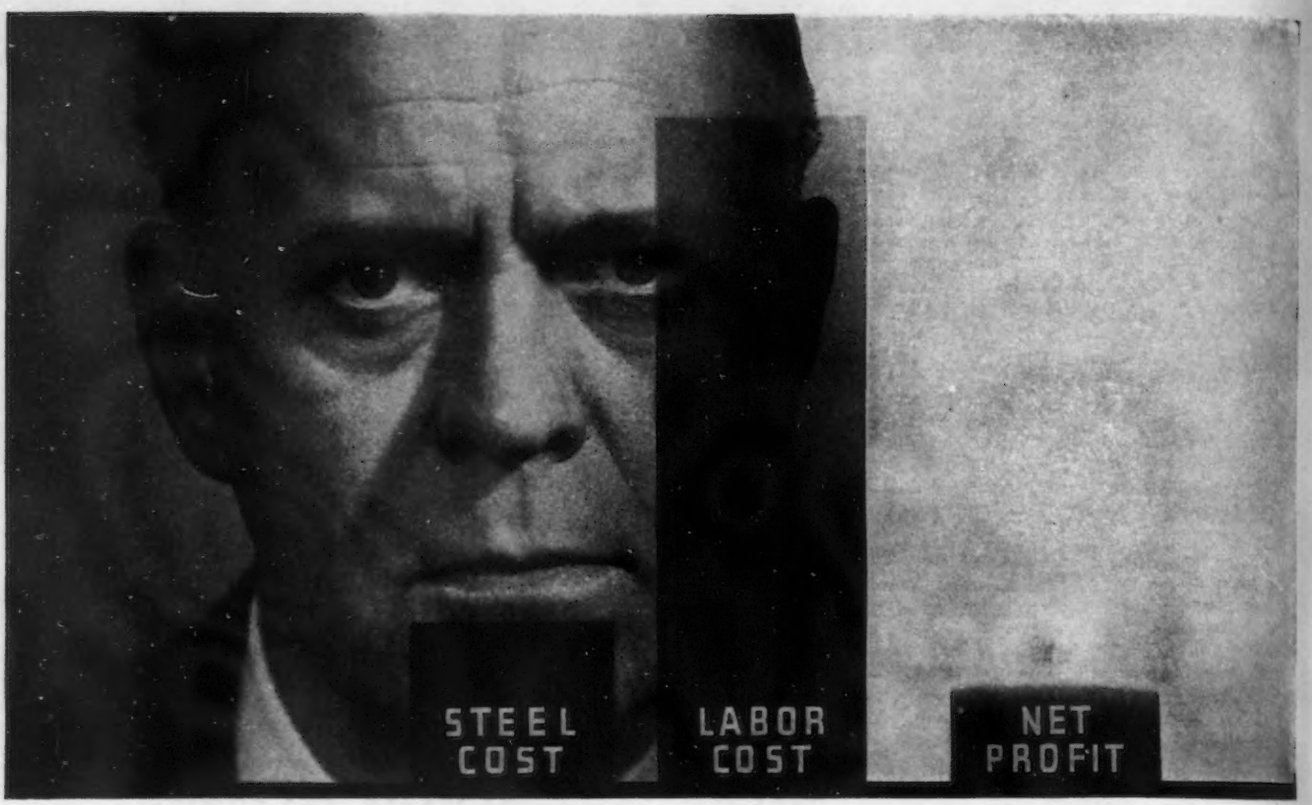
THE IRON AGE

Contents

AUGUST 17, 1939

Survival of the Unfit	29
Open-Hearth Slag Control	31
900 Ft. of Ovens for Auto Bodies	39
Manufacture of Boiler Plate	40
What's Your Job Worth	42
Stainless Steel Tubing	46
Plastics for Stampings	49
Special Tips for "Perfect" Grooves	50
Latest Offerings in Finishing Equipment	52
On the Assembly Line	58
Washington News	62
THE NEWS IN BRIEF	74
Statistics on Metal-Working Activity	83
Weekly Ingot Operating Rates	84
Rate of Activity in Capital Goods	84
Plant Expansion and Equipment Buying	100
Products Advertised	108
Just Between Us Two	110
Index to Advertisers	134

Copyright 1939 by Chilton Company (Inc.)



Consider Labor Costs When Buying Steel

On most jobs, shop labor costs are the biggest single factor—and they depend to a large degree on the steel used. If bars are too hard for bending or forming—or have hard spots to break or dull tools—if some shapes are not straight—or if in the case of alloy steel the required properties are not developed by the first heat treatment—then up go costs, down go profits.

Purchasing steel that is uniform and has the properties most desirable for your particular use often pays big dividends in the form of decreased shop costs. You do not have to pay any more for this kind of steel—so why not get it?

For several years Ryerson has been building up stocks of these better, more uniform steels. Careful selection, checking, testing and inspecting assure the uniform high quality necessary for Ryerson Certification. Try Ryerson Certified Steels on your hardest job—and check the labor costs. Many have told us that it pays.

RYERSON *Certified* **STEELS**

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON CERTIFIED STEELS

Principal products in stock for Immediate Shipment include—Bars, Structurals, Plates, Iron and Steel Sheets, Tubing, Shafting, Strip Steel, Alloy Steels, Tool Steels, Stainless, Babbitt, Welding Rod, etc.

▲▲▲ THE IRON AGE ▲▲▲

AUGUST 17, 1939

ESTABLISHED 1855 Vol. 144, No. 7

Survival of the Unfit

ONE of Nature's fundamental laws is known as "the survival of the fittest." That is not an accurate designation for the process of natural selection, since it would imply but one survivor. A better one would be "survival of the fit," or to put it into reverse English, "elimination of the unfit."

Some people profess to believe that this is a very cruel law and that it should be repealed. As a matter of fact, perhaps the cruelest thing imaginable would be to arrange for the perpetuation of the unfit. And that is just what is being attempted by our topsy-turvy New Deal economists in connection with business and industrial entities.

When a business is so sick that it cannot possibly get well, even through the ministrations of the ablest business doctors, the sooner it is permitted to die, the better. There may be good reason for forbidding euthanasia in the case of people suffering from incurable diseases; none at all in the case of an incurable business.

The fact that the New Deal has attempted, through man-made legislation, to repeal Nature's fundamental law of survival of the fit as applied to business concerns may well account for the fact that recovery and reemployment have been so long delayed.

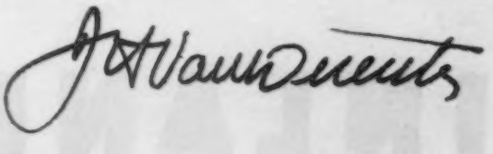
In past depressions, the curative effects began when the unfit business—the high cost members of an industry—folded up and went out of business. That made better business for the survivors and better business for them meant lower costs and prices and a stimulus to demand. Then, when the business revival really got under way, new units entered the field, further building up the strength and stature of the industry.

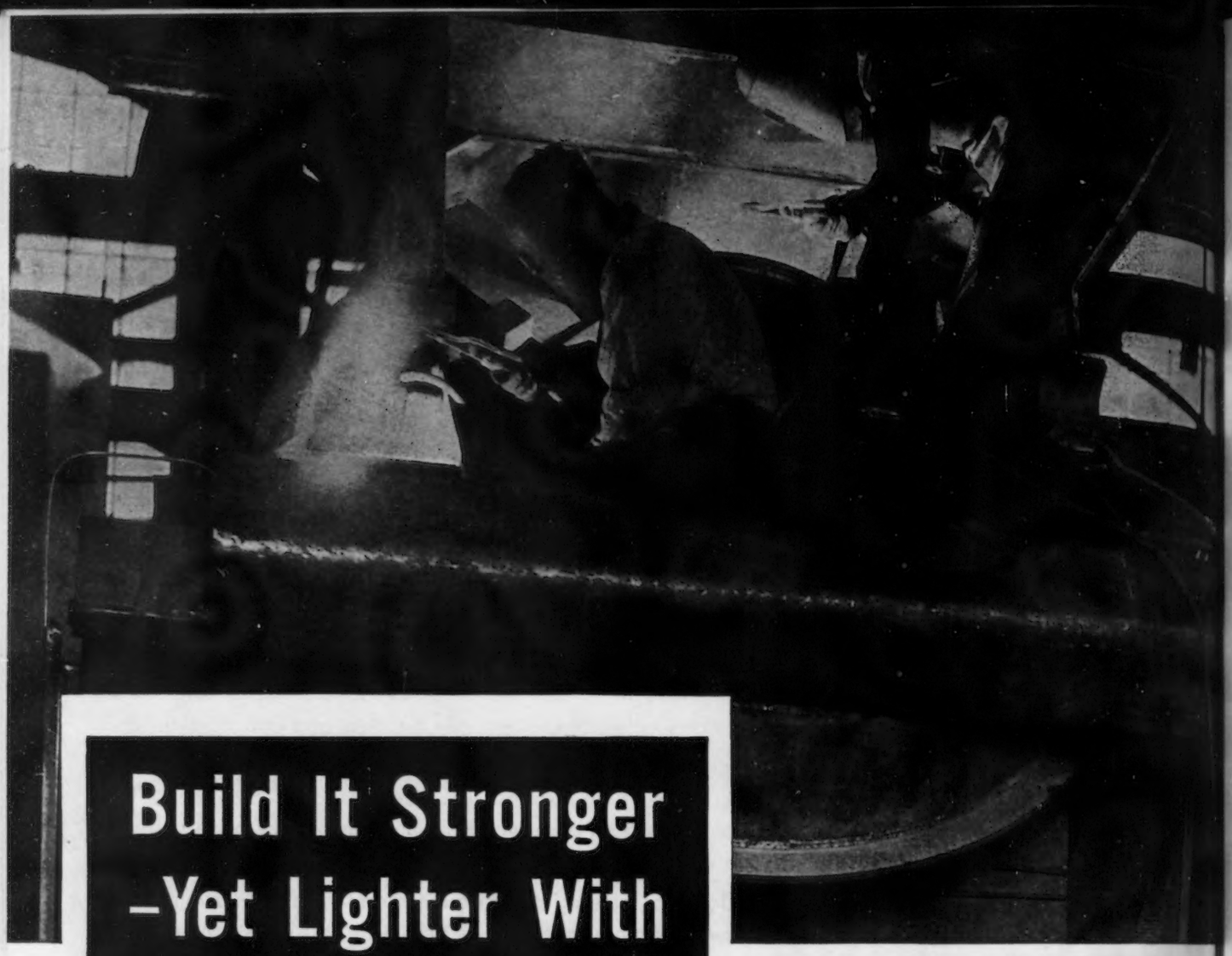
The process was exactly analogous to Nature's way of discarding the dead cells of a living organism and replacing them with new ones. That is normal, healthy growth.

Nowadays we seem to think that we must coddle the unfit. If a business has such a poor profit outlook that it cannot raise money at a bank, let it dip its hand into the United States Treasury. If a small concern can't keep pace with a larger one, let's hobble the bigger fellow. If a chain store can sell cheaper than an independent one, let's tax the chain store out of existence.

Silliest of all such crackpot notions, perhaps, is Attorney General Professor Thurman Arnold's idea that a concern with the money and the will to advertise its products is taking unfair advantage of the concern that lacks either or both.

Strong men are not reared by swaddling them in cotton batting. Nor are prosperous nations made by coddling lame ducks.

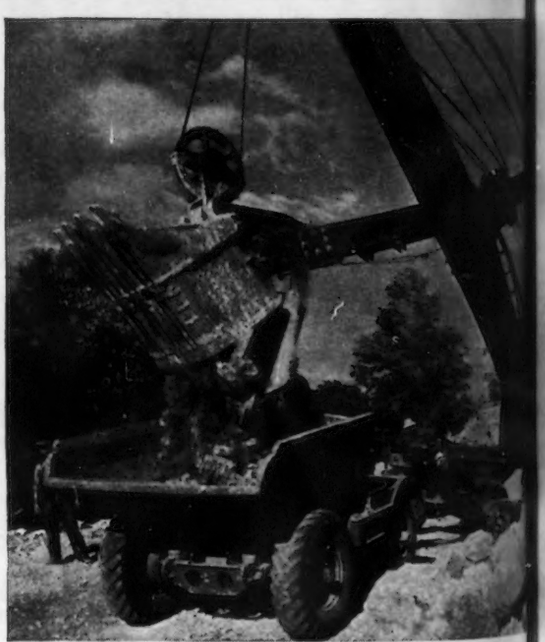




Build It Stronger –Yet Lighter With INLAND HI-STEEL

● In the modern, high-speed excavators built by this prominent manufacturer, design is not penalized by excess weight. Inland Hi-Steel, fabricated by the arc welding process, provides greater strength for vital parts that take the stresses and strains of digging. At the same time, lighter sections reduce weight on many of these parts as much as 20% and 25% to gain larger payloads and lower operating expense.

Inland Hi-Steel, the new low alloy, high strength steel, is even more corrosion-resisting than copper alloy. It is easy to weld and fabricate—used by many leading makers of construction equipment, trucks, tractors, freight cars, etc. Wherever anything must be moved, Hi-Steel cuts dead weight, increases strength and makes for lower costs. Write for Bulletin No. 10.

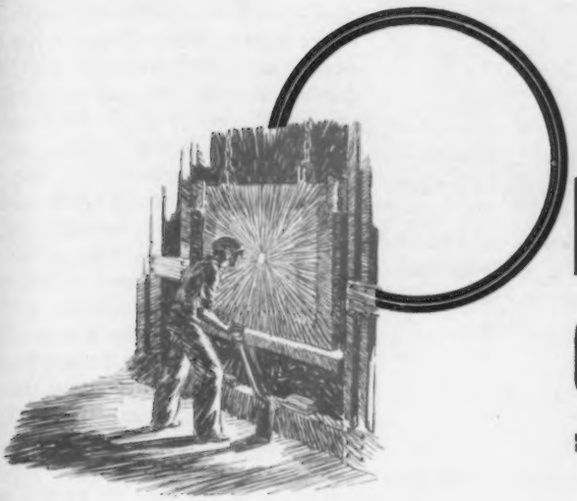


In modern excavators, Inland Hi-Steel is used for such parts as car bodies, crawler frames, revolving frames, booms, etc. where lightness with strength cuts operating costs.

INLAND STEEL CO.

38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS



Open-Hearth Slag Control

SLAG fluidity undoubtedly has considerable influence on the rate of carbon drop and thus on the production of basic open hearth steel. To control this fluidity, the viscosimeter has been found to be the best tool. Detailed data on viscosimeter technique and results obtained are included herein.

o o o

By W. J. REAGAN
Edgewater Steel Co., Oakmont, Pa.

o o o

THE viscosimeter, as a means of controlling slag fluidity, has been in use in the Edgewater Steel Co. plant for the past six years. Mention of it has been made in previous papers, but it is believed that a fully detailed description of its use should prove of considerable value. The following data were all obtained from basic open hearth steel production, all fully killed steel, ranging in carbon from 0.50 to 0.90 per cent.

By the use of the viscosimeter, a much more accurate control of slag fluidity may be obtained. The maintaining of consistent slag fluidities for certain types of steel and for certain methods of deoxidation results in more uniform furnace practice. As a result, it is possible to hold to a more consistent slag quality, which consists of fluidity and chemical analyses, and accordingly it is possible to tap more heats in grade and to make heats more uniform in nearly all characteristics.

Fig. 1 shows a sketch of the viscosimeter, which is a steel forging with a funnel at one end, connected to a 0.25 in. diameter tube 10 in. long. It is made in two pieces to allow ready removal of the previous slag sample. By filling the funnel with molten slag, and by measuring in inches the distance the molten slag runs out into the 0.25-in. tube before solidifying, there is thus obtained an indication of the fluidity of the slag. With increasing fluidity the slag runs out the hole a greater distance, and in some cases runs out the end of the viscosimeter. This latter indicates a very fluid slag. Temperature of the viscosimeter itself and temperature of the molten slag are no doubt factors, but in practice once the viscosimeter is placed in use or warmed up the effect of temperature may be neglected.

Today, so much is heard about slag composition and about the presence in the slag of dicalcium-silicate and tricalcium-silicate, etc. The furnace operator is not particularly concerned with the slag composition from the mineralogical standpoint, but is more interested in having in solution or available for work the various materials which make up his slag. If he has materials in the slag, such as lime, that are not in solution, his viscosimeter readings will give him an indication of this fact, and by its use a better knowledge of the condition of the slag will be obtained than by the usual hit or miss methods of saying it is thin or heavy or creamy.

Any attempt to control basic open hearth slags must of course start with the charge, and this consists in balancing the charge so that the heat will melt at a desired carbon. This necessitates charging a suitable amount of lime, either as limestone or as burnt lime, or a combination of both, and this amount depends upon the silicon in the charge. By such a method of control, a series of heats may be so balanced as to have them melt quite close to the desired carbon. The following data represent figures for four groups of heats, the charge on the various groups being balanced according to the carbon equivalent of the charge[1] and indicating that as the carbon equivalent of the charge is increased, the carbon at which the heats will melt will also increase: Carbon equivalent = 2.59, carbon at melting = 1.16; in same manner, 2.68 and 1.22; 2.70 and 1.30; and 2.75 carbon equivalent, 1.34 carbon at melting.

The carbon equivalent does not remain a fixed factor, but depends first upon the analyses of the charge (carbon, manganese, silicon and phosphorus), second upon the furnace and

FIG. 1—The viscosimeter is a split steel forging, the funnel part being connected to a 0.25-in. tube which is 10 in. long.

[1] Cooperative Bulletin No. 68, p. 7.

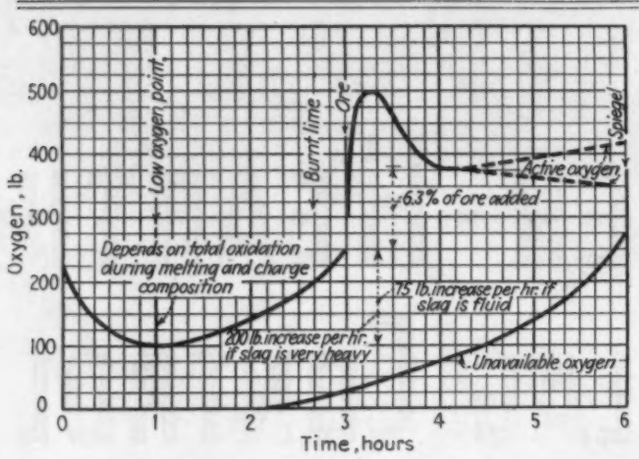


FIG. 2 — Variation of oxygen content of slag. The viscosimeter is first used at the low point in the FeO curve.

its operation (a fast working furnace requiring a lower carbon equivalent than a slow furnace). Another factor that must be considered is furnace delays due to bottom repairs etc. as long delays in charging necessitate an increase in the carbon equivalent on the next heat to be charged. To obtain best results all heats should have as nearly as possible definite and consistent percentages of each type of scrap and pig iron. Such control of the charge may seem like an ideal condition but an attempt at such ideal conditions has been made in several production shops with very gratifying results.

After the charge has been selected as well as possible, and melted down, the next step is the use of the viscosimeter. Even though the charge may vary over wide ranges, a positive fluidity control device will certainly help the furnace operator to make consistently a certain type of slag which he knows from past experience to be best suited for the type of steel that is being made.

In the type of steel made at the writer's plant, the viscosimeter is first used at the low point in the FeO curve. This is shown in Fig. 2[2]. The low point in the FeO (or oxygen) curve depends upon the amount of oxidation during melting, the metalloids in the charge and the amount of lime charged. Due to the small amount of CaO in the slag at this time (about the middle of the lime boil) it is assumed that all oxygen in the slag is available. The explanation of this FeO curve is as follows. Early in the heat, before the lime boil, the first slags formed during the oxidation of the scrap are very high in FeO, and as the charge is melted down and the percentage of the metalloids increases, FeO is being continually reduced from the slag and as a consequence the percentage of iron oxide in the slag is reduced. When the heat is "under cover" the pounds of iron oxide in the slag are found to be at a minimum, and this minimum indicates the low point in the FeO curve, and this low point determines what the FeO will be in the finishing slag. The factors controlling the low point are the total oxidation of the slag up to this point, the percentage of silicon in the charge and the amount of lime which has gone into solution in the slag.

It has been shown in a previous paper (see Fig. 3) that the higher the SiO_2 content of the slag, the lower will be the FeO content of the slag.[3] Thus it can be seen that when the SiO_2 in the slag is the highest, and also the slag most fluid, then will the lowest FeO content or the so-called low point in the FeO curve be found. This low point in the FeO curve can be more clearly seen on the graphic picture (see Fig. 4) of Heat "A" in which the progress of a heat for several hours previous to its being melted until it was tapped is clearly shown.

In Table I analyses of the heat for all metalloids, complete slag analyses, slag fluidity, etc., all in detail are

[2] Cooperative Bulletin No. 68, p. 41.
[3] A.I.M.E. Transactions, 1932, p. 147.

TABLE I

Log of Heat "A"

Time	C	Mn	P	Si	Su		Viscosimeter, Inches	FeO	Fe_2O_3	MnO	SiO_2	P_2O_5	CaO	MgO	Al_2O_3
9:35	2.25	0.31	0.081	0.047	....	.....	....	7.30	1.51	24.90	30.40	1.75	26.73	5.72	1.39
10:00	2.03	0.34	0.075	0.019	....	.....	5.9	5.36	1.64	23.40	29.92	1.91	30.57	7.27	2.07
10:30	1.82	0.36	0.064	0.005	....	.....	5.0	5.13	1.39	21.14	29.52	2.02	20.68	7.07	2.09
11:00	1.57	0.40	0.059	....	....	.....	6.9	4.33	1.26	18.97	29.48	1.91	32.94	7.39	1.36
11:30	1.47	0.42	0.046	....	0.026	.....	3.6	4.79	1.77	17.10	28.16	1.93	37.49	7.40	1.16
11:31	....	....	....	....	....	1000 lb. lime	....	....	....	....	....	....	....	....	....
12:00	1.38	0.43	0.035	....	0.024	.....	2.6	5.81	2.65	15.60	25.76	2.30	38.01	6.59	1.00
12:03	....	....	....	....	....	2500 lb. ore	....	....	....	....	....	....	....	....	....
12:13	1.28	0.27	0.021	....	....	.....	4.0	11.51	2.90	15.21	22.68	2.79	37.14	6.23	1.52
12:23	1.20	0.28	0.022	....	....	.....	4.0	10.94	3.03	15.10	21.80	3.26	37.11	5.40	2.80
12:33	1.14	0.26	0.019	....	....	.....	4.3	10.60	3.15	15.10	21.68	3.26	38.00	5.38	2.38
12:53	1.05	0.31	0.017	....	....	.....	0.2	9.35	3.03	14.30	21.68	3.19	40.58	5.36	2.64
1:04	....	....	....	....	....	250 lb. spar	....	....	....	....	....	....	....	....	....
1:13	0.98	0.36	0.016	....	....	.....	1.9	8.55	3.15	12.63	21.12	3.01	43.61	5.63	2.52
1:34	0.90	0.40	0.016	....	0.022	.....	0.5	7.75	4.16	11.32	19.40	2.88	46.73	5.36	2.32
1:38	....	....	....	....	....	250 lb. spar	....	....	....	....	....	....	....	....	....
1:53	0.84	0.44	0.013	....	....	.....	2.9	7.30	4.41	10.71	18.76	2.62	47.52	5.56	1.84
2:03	....	....	....	....	....	185 lb. fine ore	....	....	....	....	....	....	....	....	....
2:13	0.77	0.45	0.015	....	....	.....	2.5	7.07	4.03	10.28	18.40	2.74	48.86	5.75	2.28
2:22	....	....	....	....	....	25 lb. spar	....	....	....	....	....	....	....	....	....
2:24	0.73	0.44	0.015	....	....	.....	6.8	7.07	5.19	10.25	18.08	2.55	47.70	6.30	1.92
2:25	....	....	....	....	....	Spiegel added	....	....	....	....	....	....	....	....	....
2:36	....	0.55	0.014	....	....	.....	6.2	7.36	4.96	10.64	....	2.60	....	....	....
2:42	....	....	....	....	....	Mn added	....	....	....	....	....	....	....	....	....

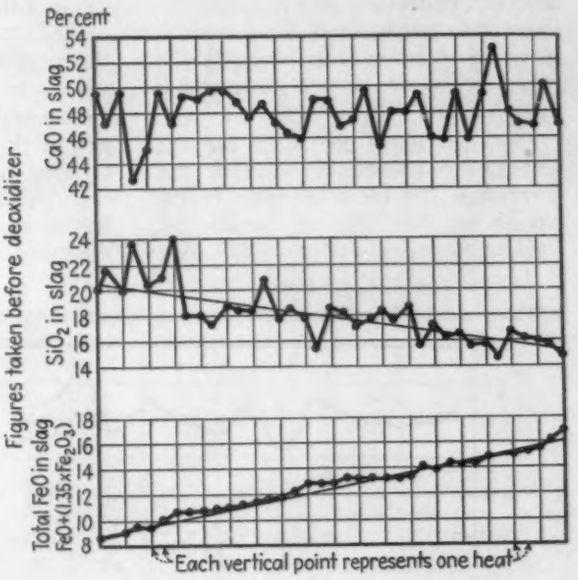
given. This graph shows that at about 11:00 o'clock the low point in the FeO curve was reached when the FeO content was 4.33 per cent. At the same time the SiO_2 in the slag was 29.48 per cent and the fluidity was 7 in. This low point is usually found about the middle of the lime boil and a series of slag samples starting some time previous to the lime boil will usually indicate the low point by giving the most fluid slag reading on the viscosimeter. At this time a slag sample is sent to the laboratory for a determination of FeO and when this fact is known a start is made in shaping up the slag.

It will be noted that as soon as the low point is reached the curve gradually turns upward. This may be explained by the fact that at the low point in the curve the SiO_2 content of the slag is very high and the CaO content very low (on Heat "A") about 32.94 per cent CaO and 29.48 per cent SiO_2). During the lime boil CaO is continually dissolving in the slag, and after a certain percentage has gone into solution the slag thickens up very rapidly and many lumps of undissolved lime are found in the slag. Due to the presence of these lumps the effective slag metal area is increased very much and it has been found that the lower layers of the slag at this time are usually less fluid than the upper layers. Both of these items make the transfer of oxygen from slag to metal slower than the transfer from gas to slag, and as a result after a certain fluidity has been reached the increase in the FeO in the slag is very rapid. This can be clearly noted on the FeO curve on Heat "A" where the FeO increases from 4.33 per cent at 11:00 o'clock at the low point to 5.81 per cent one hour later.

Experimental work has shown that with fluidities of 2 or 3 in. or less the oxygen pick-up is very rapid. This indicates a very heavy slag. Slags with greater fluidity give a constant oxygen (neither an increase or a decrease) while very fluid slags usually show a loss of oxygen during the refining period. From this it can be seen that maintaining a definite slag fluidity allows the operator to increase or decrease the oxygen content of the slag, and by the use of the viscosimeter this fluidity may be controlled. Needless to say, the skill and judgment of the melter plays a very important part in the use of this device. First, he must know what fluidity he wishes to maintain and, second, he must be very familiar with the action of the various materials he has available to maintain this fluidity. The melter is somewhat

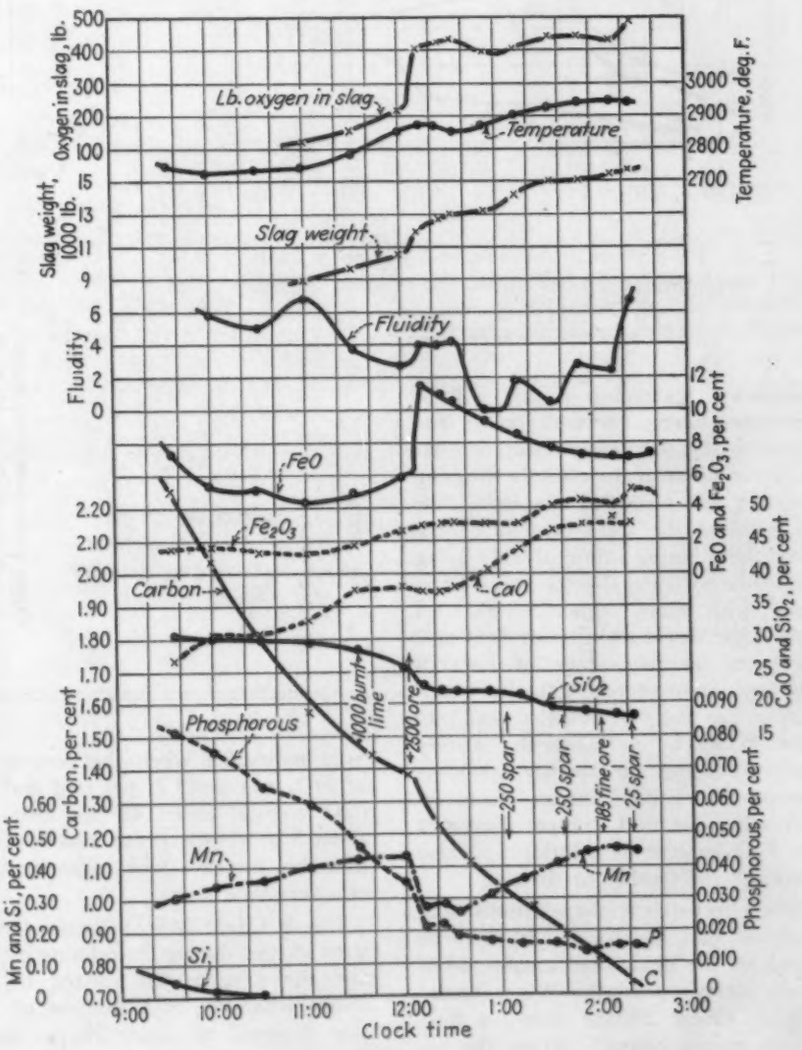
AT RIGHT

FIG. 3 — Relation of iron oxide to SiO_2.



BELOW

FIG. 4 — Progress of Heat "A" for several hours previous to being melted and up until it was tapped.



limited in the materials he has available for controlling slag fluidity. To name them briefly, there is lime, usually as burnt lime; iron oxide, in the form of fine ore or mill scale; sand, fluorspar and temperature.

Fluorspar thins the slag, causing more lime to dissolve and increases the percentage of CaO in the slag. Herty has shown that with an increase of CaO or increasing basicity, Fe_2O_3 also

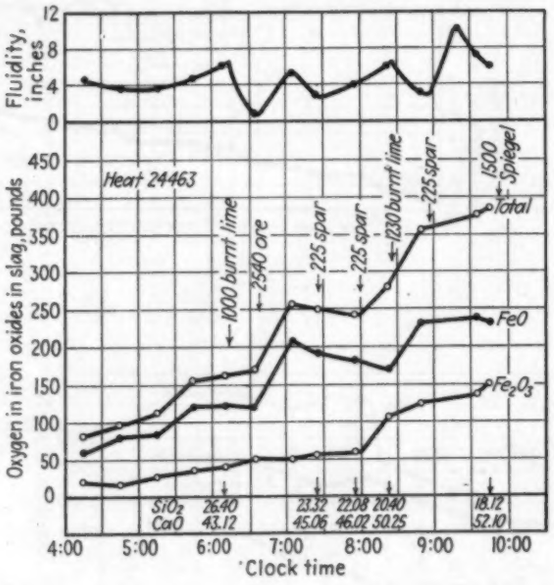


FIG. 5—Action of oxygen in slag on a heat which gained oxygen during the refining period.

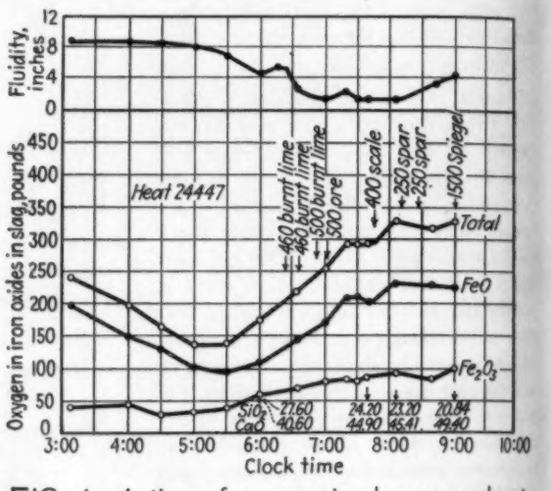


FIG. 6—Action of oxygen in slag on a heat which gave a constant oxygen during the refining period.

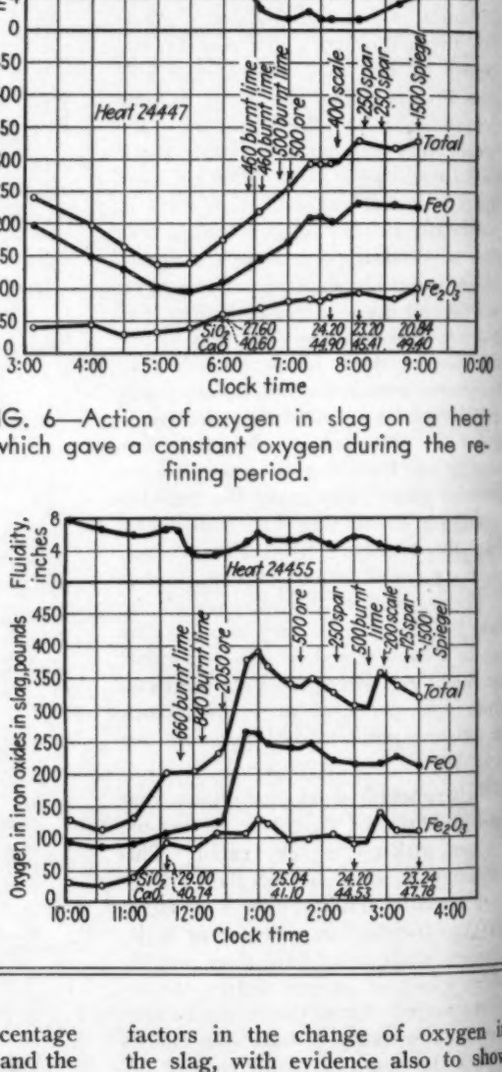


FIG. 7—Action of oxygen in slag on a heat which lost oxygen during the refining period.

increases. Examples of this will be presented later. The addition of iron oxide to the slag gives results similar to the addition of fluorspar in thinning the slag and also dissolves more lime to increase the CaO content of the slag, the thinning action of FeO being particularly noticeable at lower carbons with their higher FeO's. Of course the direct addition of FeO also increases the percentage of FeO in the slag. Lime increases the CaO content of the slag, provided it goes into solution, and by increasing the basicity and decreasing the fluidity, also increases the Fe_2O_3 content. Sand by increasing the SiO_2 content decreases the FeO content by dilution and also increases the fluidity of the slag.

The effect of various additions, slag analyses, etc., on slag fluidity may be noted on the next three graphs taken from Herty's work on this subject.[4] Fig. 5 (Heat 24463) shows a heat which gained oxygen during the refining period. Pounds of oxygen are shown rather than percentage of FeO or Fe_2O_3 as by increasing slag weights the percentage would change but total pounds of oxygen would not change. In this heat there is found a very basic slag with the pounds of oxygen increasing very rapidly at the end of the heat. An increase in Fe_2O_3 caused by the increasing basicity of the slag was the cause for this increase, and it was most noticeable when the percentage of SiO_2 was about 21 per cent and the CaO content about 48 per cent—or about 8:00 o'clock. It can also be noted that this increase took place in spite of a very fluid slag.

Fig. 6 (Heat 24447) shows a constant oxygen during the refining period and the oxygen just started to increase when the SiO_2 content of the slag dropped to about 21 per cent. Fluidity on this heat was medium or about 4 in.

Fig. 7 (Heat 24455) shows a slag with decreasing oxygen with three distinct decreases indicated, first after the main ore addition, second after a smaller ore addition and third after additions of burnt lime and scale. The SiO_2 content was high all through this heat (from 23 to 25 per cent) and fluidity was from 4 to 6 in. From these data it may be seen that lime and silica were the most important factors in the change of oxygen in the slag, with evidence also to show that of two slags of similar content of CaO and SiO_2 the most viscous slag increases more rapidly or loses oxygen less rapidly.

Now, in order to control slag fluidities the effects of various additions on the various types of slags should be considered. First, with a weakly basic slag it is found that the FeO content of the metal is usually higher, for a given FeO content in the slag,

[4] Cooperative Bulletin No. 68, pp. 54-55.

than on a strongly basic slag. This is possibly due to a tie-up of lime and FeO in the slag, making some of the FeO unavailable. There is a tendency for weakly basic slags to decrease in FeO due to having relatively small changes in fluidity with temperature. If additions of ore are made while the slag is weakly basic, the amount of carbon eliminated by the ore will be greater than if the slag is very basic, because the transfer of oxygen (FeO) from slag to metal will be more rapid and the amount of carbon eliminated will be greater than with a very basic slag. There will also be less possibility of the formation of lime-iron compounds which make unavailable some of the FeO. With this type of slag it is as a rule necessary to increase the CaO content of the slag by the addition of lime. Fluorspar additions and the use of fine ore assist in putting into solution undissolved lime in the slag.

With strongly basic slags it is found that the FeO content of the metal is usually lower, for a given FeO in the slag, than for a weakly basic slag. Before ore additions, this type of slag, basic and heavy, will contain more FeO than a weakly basic slag, and in very basic slags a rapid change of fluidity with temperature is found unless they are kept fluid with fluorspar. If the FeO content of the slag is to be kept as low as possible, the slag should not be allowed to become basic early in the heat.

Herty states[5] that with very fluid slags the most rapid increase in total oxygen is found with high lime and low silica contents, and as the silica increased or the lime decreased the rate of increase was less and, finally, at fairly low limes and high silicas the total oxygen decreased. FeO does not build up as shown previously, but with very fluid slags, decreases. Herty has also shown[5] that with very fluid slags of 45 to 46 per cent CaO and 21 to 22 per cent SiO_2 the change in total pounds of oxygen was from 0 to 1.0 lb. per min., but with heavy slags of similar analyses the oxygen change was over 1.0 lb. per min.

The relative fluidity of slags has been shown by Herty[6] and the data is of sufficient interest to reproduce (see Fig. 8). He explains the change in FeO content of the slag with change in slag composition by the following theory. At all times during the heat unless the slag is being deliberately cooled, the upper layers of the slag are at a higher temperature than the lower layers. Therefore if a given slag has a relatively small change of fluidity with temperature it would be expected that the rates of transfer of oxygen would depend upon factors other than changes in fluidity. However, if the slag had a high rate of change of fluidity with temperature,

[5] Cooperative Bulletin No. 68, p. 56.
[6] Cooperative Bulletin No. 68, pp. 60-61.

TABLE II

Slag Analyses for Heat "E"

Sample No.	A	B	C	D	E
Viscosity	10.0	7.4	4.5	3.5	4.0
FeO	8.77	4.48	6.02	9.80	7.21
Fe_2O_3	1.26	2.22	2.89	3.56	4.56
MnO	20.02	16.47	13.54	13.05	11.47
P_2O_5	0.57	1.09	1.76	2.21	1.94
SiO_2	33.12	28.40	25.70	24.20	19.20
CaO	27.76	35.81	41.53	40.15	46.90
MgO	4.35	5.84	5.70	5.51	4.63
*V-Value	0.82	1.26	1.61	1.66	2.58
Carbon	....	1.40	1.14	0.91	0.60

$$*V \text{ Value} = \frac{CaO - 1.19\ P_2O_5}{SiO_2}$$

TABLE III

Log of Heat "E"

Sample No.	Time	C	Additions
A	4:00	....	.....
B	5:30	1.40	.....
C	7:40	1.14	.....
	7:45	....	1300 lb. burnt lime.
	8:10	1.12	.....
	8:15	....	2000 lb. ore.
D	8:35	0.91	.....
	8:40	....	600 lb. scale.
	9:00	0.76	.....
	9:10	....	200 lb. fluorspar.
	9:25	....	200 lb. fluorspar.
	9:30	0.68	.....
	9:40	....	100 lb. fluorspar.
	9:55	0.60	.....
	10:20	....	Deoxidizer added.
	10:45	....	Tapped

TABLE V

Log of Heat "G"

Time	Viscosity, Inches	C	P	Mn	Iron Ore	Lime	Scale	Spar
5:45	7.8	....	....	....	....	....	....	....
6:00	6.5	....	....	....	....	....	....	....
6:30	6.2	....	....	....	....	....	....	....
7:00	7.7	....	....	....	....	....	....	....
7:30	2.9	....	....	....	....	....	....	....
8:15	2.5	1.22	....	....	....	....	....	....
8:20	...	....	....	....	....	1100 lb.	....	....
8:40	5.6	....	....	....	....	....	....	....
8:45	...	1.17	....	....	2300 lb.	....	....	....
9:05	7.1	1.05	....	....	....	....	....	....
9:20	4.4	1.03	0.028	0.34	....	....	500 lb.	....
9:40	6.0	0.99	....	....	....	....	....	....
10:00	2.0	0.86	....	....	....	....	....	....
10:10	...	....	....	....	....	....	....	200 lb.
10:15	...	....	....	....	....	....	....	200 lb.
10:20	...	....	....	....	....	....	....	200 lb.
10:30	...	....	....	....	....	....	....	200 lb.
10:35	...	....	....	....	....	....	....	200 lb.
10:40	8.3	0.79	0.018	0.39	....	....	....	....
10:45	...	....	....	....	....	....	....	200 lb.
10:50	...	....	....	....	....	....	....	200 lb.
11:00	8.4	0.75	....	0.43	....	Deoxidizer added		
11:20	...	....	....	....	....	Tapped		

TABLE IV

Log of Heat "F"

Time	Viscosity, Inches	C	P	Mn	Iron Ore	Lime	Scale	Spar
4:50	5.0	....	....	....	....	....	....	....
5:20	3.5	....	....	....	....	....	....	....
6:20	2.5	1.34	....	....	....	....	....	....
6:25	...	....	....	....	....	1180 lb.	....	....
6:50	2.5	....	....	....	....	....	....	....
7:00	...	1.31	....	....	4000 lb.	....	....	....
7:40	4.7	1.15	....	....	....	500 lb.	....	....
7:45	...	....	....	....	500 lb.	....	....	....
8:00	6.2	1.05	....	....	....	....	....	....
8:05	...	....	....	....	....	....	450 lb.	....
8:20	2.0	0.97	0.020	0.29	....	....	....	....
8:25	...	....	....	....	....	....	450 lb.	....
8:40	5.5	0.92	....	....	....	....	....	....
8:50	...	....	....	....	....	....	....	200 lb.
8:55	...	....	....	....	....	....	....	200 lb.
9:00	6.9	0.85	....	....	....	....	....	....
9:05	...	....	....	....	....	....	....	200 lb.
9:10	...	....	....	....	....	....	....	200 lb.
9:15	...	....	....	....	....	....	....	200 lb.
9:20	3.8	0.75	....	0.36	....	....	....	200 lb.
9:35	...	....	....	....	....	....	....	200 lb.
9:40	7.5	....	....	....	....	....	....	....
9:50	7.0	0.74	....	0.41	....	Deoxidizer added		....
10:15	...	....	....	....	....	Tapped		....

it would be expected that the rate of transfer of oxygen from slag to metal would be slower than the rate of transfer of oxygen to slag.

By means of a series of fluidity tests made on samples of slag and held in the test spoon for various lengths of time and poured into the viscosimeter some interesting results were obtained. The slag samples were withdrawn from the furnace at eight different periods during a heat of high carbon steel. For any given set of samples the first sample was poured into the viscosimeter as soon as possible, averaging 4 sec. from the time the spoon was taken out of the furnace. Samples were held in the spoon for various lengths of time and then poured into the viscosimeter and this system was followed for each set of samples. It can be noted that slags No. 1 and No. 2, which were by far the most weakly basic, showed the least drop in temperature and stayed fluid longer; and as the slags became more basic the fluidity decreased more rapidly, and finally at sample No. 7 the slag could not be poured from the spoon 15 sec. after the spoon was withdrawn from the furnace. These results indicated that as the slags became more basic, the viscosity at the slag metal surface would be much higher for a given viscosity at the slag gas interface than would be the case in the more acid slags. These results indicate that the change in FeO content of the slag as affected by slag composition may be attributed to changes of slag fluidity with changes in temperature between gas and metal surfaces.

Typical control of slag viscosity, together with the appearance of the slag cakes taken at the same time and also slag analyses is shown in Fig. 9 and Table II. Table III gives a short log of this typical heat. Slag "A" from this heat is a typical highly siliceous slag taken early in the heat with a high slag fluidity. The V value for this slag (or the lime-silica ratio corrected for P_2O_5 is 0.82 and slag analyses is 33.12 per cent SiO_2 and 27.76 per cent CaO. Extreme fluidity is found on nearly all slags of this type. Slag "B" is another quite fluid slag taken about the middle of the lime boil and also at the low point in the FeO curve. FeO on this slag is 4.48 per cent, as compared with 8.77 per cent on the previous slag, while SiO_2 is 28.40 and CaO is 35.81 per cent. Some lime has gone into solution and the heat at this time is about all melted and under cover, and at 7:45 o'clock 1300 lb. of burnt lime is added to increase the CaO content and at 8:15 o'clock 2000 lb. of iron ore is added. At 7:40, slag "C" is taken, or shortly before the addition of burnt lime and iron ore. Lime has again gone into solution and has increased the CaO from 35.81 to 41.53 per cent. SiO_2

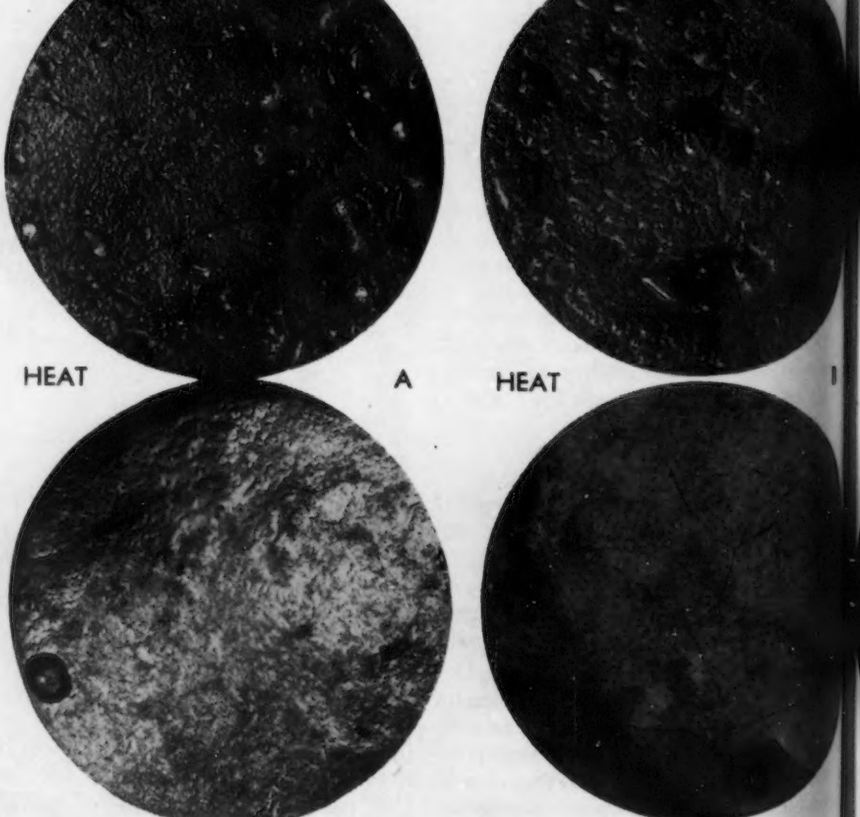
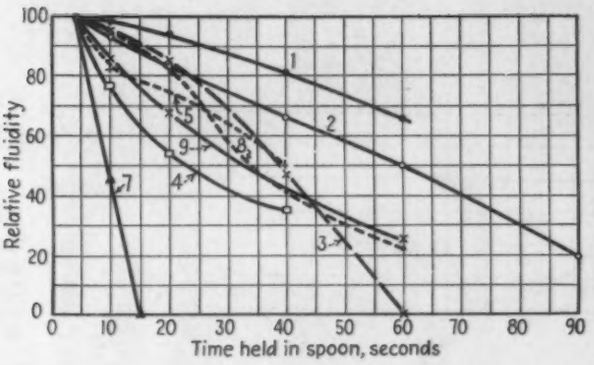


FIG. 9—Appearance of slag cakes during the working of a

has decreased and the slag has increased in viscosity from 7.4 in. to 4.5 in. Slag "D" is taken shortly after the ore addition, and the effect of the ore upon the increase in FeO can be noted, FeO increasing from 6.02 to 9.80 per cent; all other constituents are about the same, and slag viscosity has increased from 4.5 in. to 3.5 in. Slag "E" is taken at tapping, with a slag fluidity of 4.0 in. and SiO_2 19.20 per cent with CaO about 46.90 per cent. This slag was kept rather heavy all through the heat and the viscosity ranged between 3.5 and 4.5 in. during the refining period. About the only change in the appearance of the slag cakes that can be correlated with slag analyses is the lime-silica ratio and this only if all details of the heat are available. The slag gradually changes from a high silica glassy type slag to a high lime dark black slag.

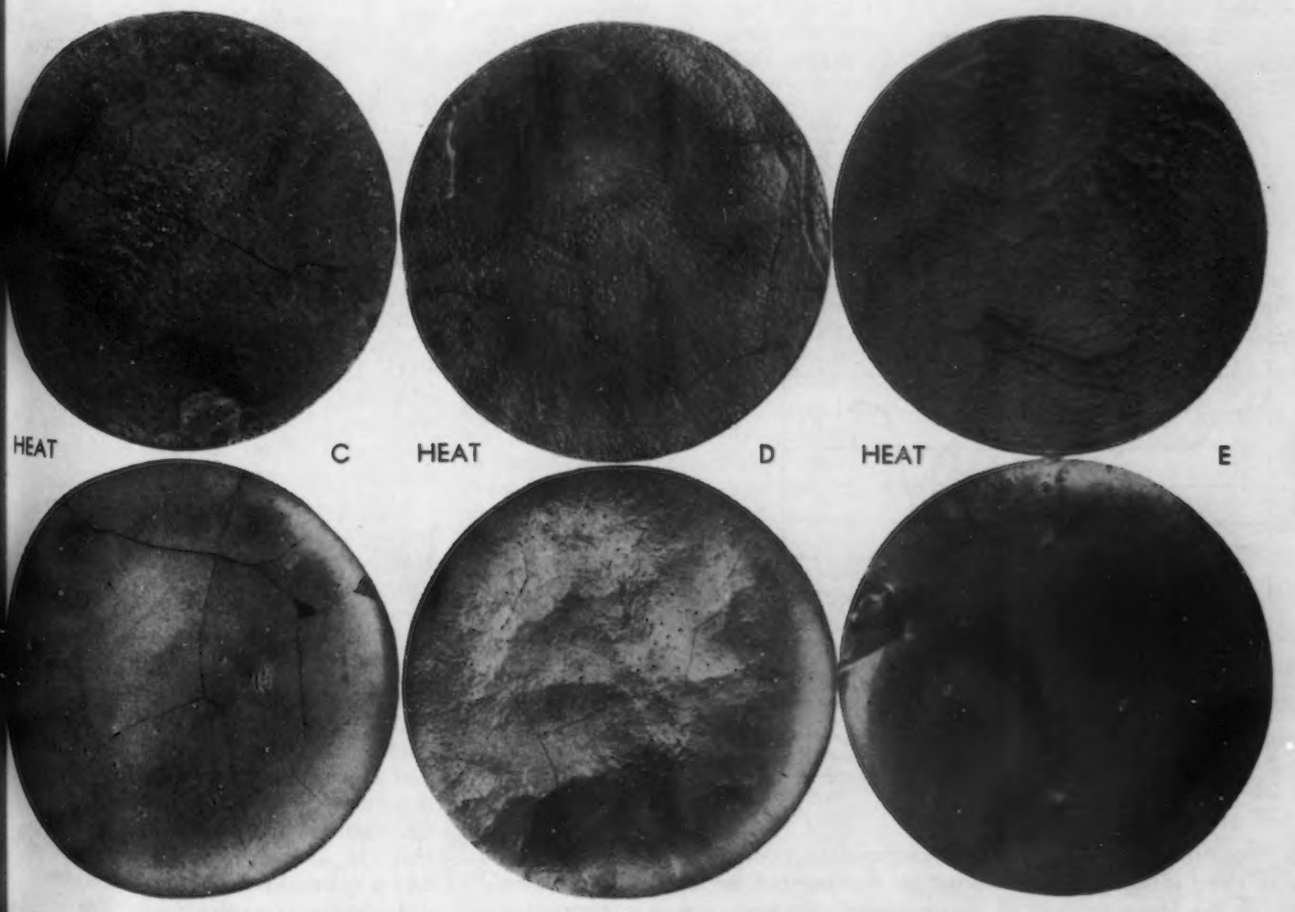
Data on two other heats will be found in Figs. 10 and 11, showing typical control practice with the viscosimeter. Heat "F" is a spiegel-killed heat made to finish 0.75 to 0.80 carbon with an FeO content of about 7 per cent, a final phosphorous of about 0.025 per cent and a slag fluidity



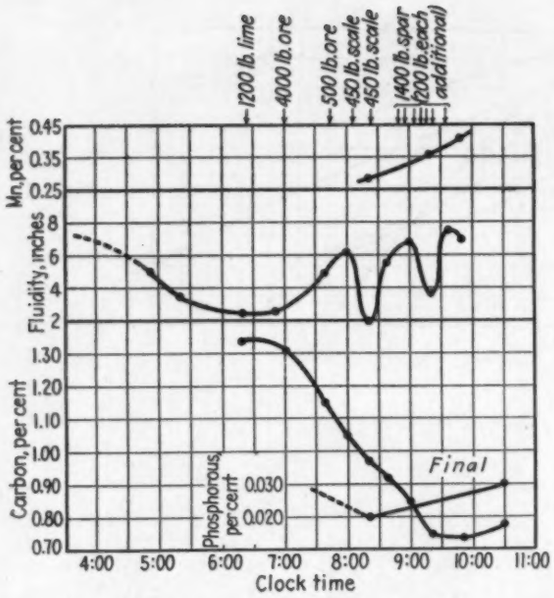
Slag analyses for fluidity tests.

Slag No.	Per cent							
	FeO	Fe_2O_3	MnO	SiO_2	P_2O_5	CaO	MgO	Al_2O_3
1	4.85	1.17	20.47	28.80	1.94	33.44	7.01	1.72
2	4.88	1.04	19.55	28.08	2.19	34.67	6.77	1.76
3	5.68	1.48	17.66	26.72	2.29	36.43	6.52	1.76
4	6.45	2.17	16.42	25.24	2.58	38.19	6.24	1.67
5	7.18	3.12	15.29	23.20	2.25	40.22	6.13	1.72
7	9.25	2.90	11.95	19.00	2.88	45.94	5.23	1.89
8	9.42	3.28	11.22	17.24	2.68	47.87	5.23	2.21
9	9.13	3.78	10.62	16.34	2.30	49.23	5.09	1.88

FIG. 8—Change in relative fluidity of open hearth slags with decreasing temperature.



nalyses of the slags and log of this typical heat are shown in Tables II and III respectively.



	FeO	Fe_2O_3
At Low Point	2.52	
Before Deoxidizer	7.70	3.87

Final

C	0.78
P	0.030
Mn	0.72
Si	0.28
Su	0.022

Time Charge to Tap—11 Hr. 20 Min.

Additions

Spiegel	2000 Lb.
FeMn	600 Lb.

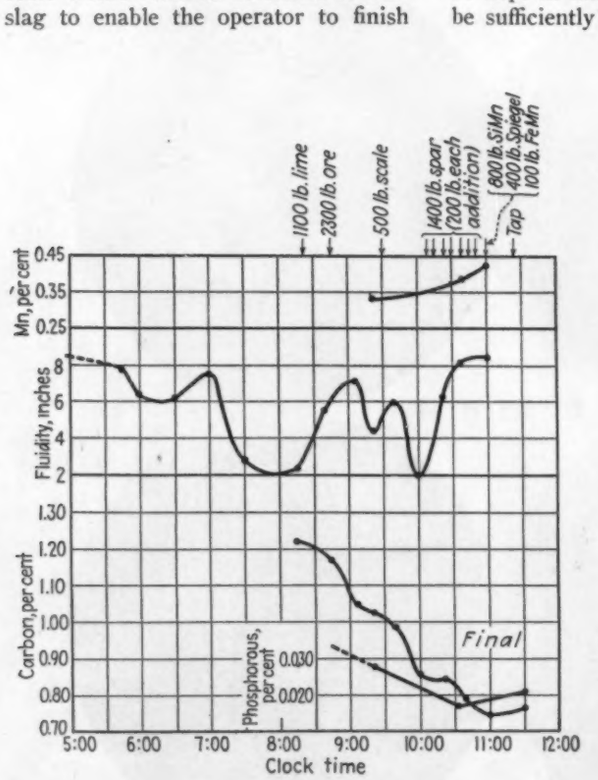
FIG. 10—Heat "F". This spiegel-killed heat was made to finish 0.75 to 0.80 carbon, with an FeO content of about 7 per cent, a final phosphorous of about 0.025, and a slag fluidity at tapping of about 7 in.

at tapping of about 7 in. This heat melted at about 1.31 carbon and the FeO at the low point was 2.52 per cent. This low FeO would indicate, along with the high slag fluidity, that either lime or FeO in the form of scale would have to be added to this slag to enable the operator to finish the heat with the required phosphorus under 0.04 per cent and with an FeO of about 7 per cent.

Due to the addition of spiegel as a deoxidizer with its silicon content of about 4 per cent, two things must be kept in mind: First, the slag must be sufficiently basic (ratio of CaO to SiO_2) so that after the silicon addition the increased SiO_2 in the slag will not cause a reversion of phosphorous. In addition, sufficient fluidity must be maintained to prevent a phosphorous reversion as it has been found that with fluid slags a reversion is less liable to occur. In this heat 1200 lb. of burnt lime was added as the lime in the charge was on the low side. Scale was added at 8:05 o'clock and again at 8:25 o'clock, showing that the melter anticipated trouble with his phosphorous unless either lime to increase CaO or scale to increase the FeO was added. His slag viscosity indicated that he had sufficient lime in his slag so the only other thing he could do was to add scale. Final FeO on this heat was 7.70 per cent (7 per cent aimed at) and final phosphorous was 0.030, with a slag fluidity of 7 in. See Table IV for log.

Fig. 11 and Table V give details of a typical silico-manganese killed heat. With this type of deoxidizer, carrying a higher silicon content, it is necessary to carry a more fluid slag than by using spiegel. In this heat the usual lime addition was indicated by the very fluid early slag. Slag fluidity was high during all the early stages of this heat and FeO at the low point was 4.59 per cent, somewhat higher than usual. However, a phosphorus preliminary at 9:20 o'clock of 0.028 per cent indicated that more FeO would be needed in this slag, especially with this type of deoxidizer; so 500 lb. of scale was added at 9:30 o'clock, which increased the fluidity from 2 in. to 6 in. Final fluidity aimed at was 8 in. and actual measurements were 8.6 in. Slag fluidity on heats killed with this type of deoxidizer is important, especially with low FeO slags, as the large amount of silicon added can easily cause a phosphorous reversion. Final phosphorous on this heat was 0.021 per cent and final FeO was 8.06 per cent.

Slag fluidity is a very important factor in the production of basic open hearth steel. It undoubtedly has considerable influence upon the rate of carbon drop and just what its effect is upon several other factors is still an unknown. Operators also are at a loss to understand the effects of slight changes in slag composition upon fluidity, and always there is the question of temperature as one of the most important unknowns. Possibly slag temperature and metal temperature hold the answer to many of the industry's problems. Nevertheless, the viscosimeter is a very useful tool for maintaining definite slag viscosities.



	FeO	Fe_2O_3
At Low Point	4.59	
Before Deoxidizer	8.06	3.04

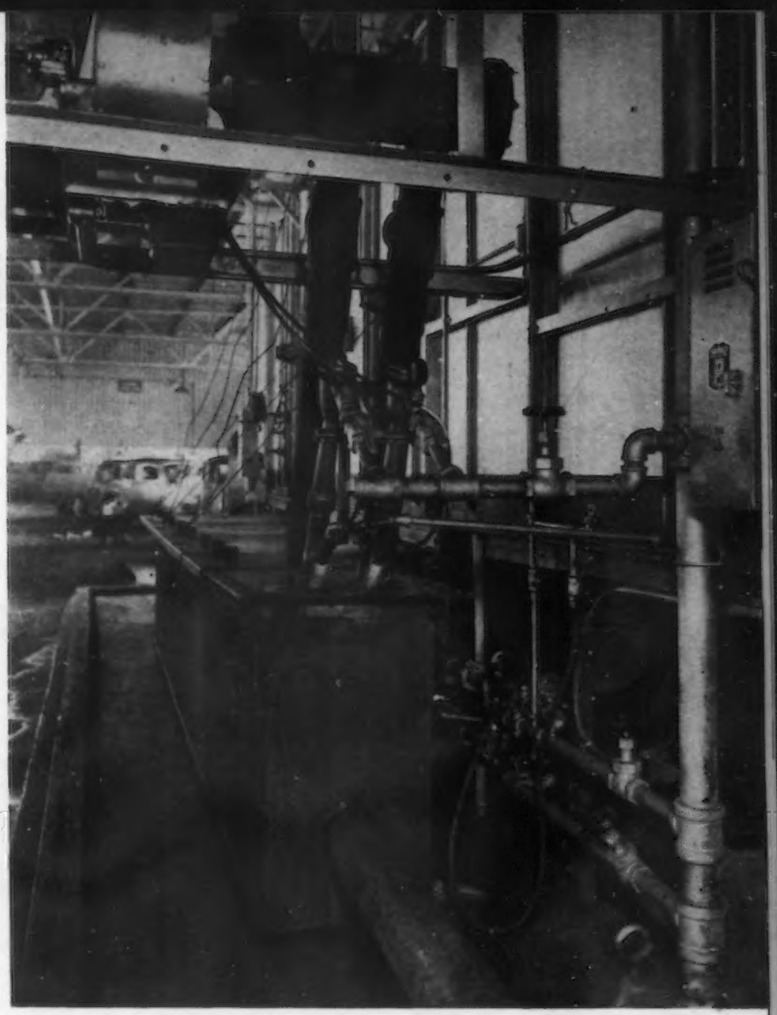
Final

C	0.77
P	0.021
Mn	0.69
Si	0.23
Su	0.021

Time Charge to Tap—11 Hr. 15 Min.

FIG. 11—Heat "G". Typical silico-manganese killed heat. Slag fluidity on heats killed with this type of deoxidizer is important, especially with low FeO slags, as the large amount of silicon added can easily cause a phosphorous reversion.

900 FT. OF OVENS FOR AUTO BODIES



ONE of six Surface Combustion Corp. immersion-type high-pressure inspirating burner assemblies, recently installed, serving the bonderizing oven.

At the South Gate assembly and finishing plant of General Motors Corp. near Los Angeles, where the Buicks, Oldsmobiles and Pontiacs of the Far West are now being put together from the innumerable separate parts made in Mid-West factories, 35 automobile bodies per day move through an interesting series of natural-gas-fired ovens *over 900 ft. long* to receive their final finish. The first 150 ft. of this magic tunnel—the bonderizing unit—is particularly interesting by virtue of its efficient and automatic operation and the latest developments in high-capacity liquid heating which it incorporates.

This bonderizing unit, 11 ft. wide by 9 ft. 3 in. high, is divided into six contiguous compartments with openings from one to the other just large enough to clear the overall car body dimensions. Its function is to spray upon every exposed square inch of the body a sequence of solutions which conditions the steel surface with a phosphate coating before the application of the priming coat, the ground coat, and the final duco layers.

Compartment No. 1 serves to clean away oil, grease and other smudge with a powerful alkali spray. Compartments No. 2 and 3 are successive clear-water rinsing chambers, and compartment No. 4 actually applies the bonderizing solution. The fifth chamber again rinses the surface, and No. 6 gives it a chromic acid spray-bath for neutralizing excess bonderizing solution. In all, over 130 spray pipes are located at the top and sides of the six compartments. Centrifugal pumps circulate the water and various mixtures at 20 lb. pressure. Water-overflows carry away the accumulated grease and other impurities from all tanks except No. 4, the bonderizing unit. None of the bonderizing solution is permitted to escape.

In every case, the liquid is heated by immersion-type, high-pressure air-inspirating gas burners with cast iron tips. Pilot lights are spark-plug ignited. Natural gas is used at a pressure of 9½ lb. and is fired at an angle down into steel combustion tubes which run longitudinally through the liquid in the storage tank. Such a system permits a maximum degree of heat removal from the hot products of combustion as these products travel along their hairpin routes to the exhaust blower intakes. Operation is completely automatic, and correct temperatures are maintained throughout the tank liquid by thermostatic control.

Compartments	Number of Burners	Tank Capacity, Gal.	Water Used, Gal. Per Hr.	Temperature, Deg. F.	Hourly Gas Consumption, Cu. Ft.
(1) Alkali spray	6	2637	750	180	3169
(2) Hot water rinse	2	2637	750	180	1102
(3) Hot water rinse	2	1852	750	180	1102
(4) Bonderizing	3	2523	280	170	864
(5) Hot water rinse	2	1142	280	180	495
(6) Neutralizing bath	2	1673	280	170	1102

The accompanying table gives data indicative of the economy achieved, and the photograph illustrates the compactness and convenience of a representative solution heating unit (this one being the 2-burner unit for compartment No. 2).

This equipment has given eminently satisfactory service since its installation in 1938, and is considered a model for modern efficient use of gas fuel in liquid heating.

The remaining 750 linear feet of gas-fired equipment in the body-finishing line is broken up as follows: 80 ft. of recirculated hot-air oven for drying the freshly-applied bonderizing coat; 220 ft. of low-pressure gas-fired oven for drying the priming coat; another 220 ft. of gas oven for drying the glaze; 57 ft. of gas oven to succeed "wet standing"; 30 ft. of gas oven to dry the ground coat; and 148 ft. of gas oven to follow duco spray operations. All of these ovens are fired with natural gas through low-pressure burner systems. A final spot-drying oven dries the body polish. The seven ovens carry a total of 32 gas burners whose cumulative input rating is 17,500,000 B.t.u. per hr. In all, the South Gate plant consumes about 10,000,000 cu. ft. of natural gas per month.

MANUFACTURE OF BOILER

By W. G. THEISINGER

Welding and Metallurgical Engineer, Lukens Steel Co.

o o o

THE manufacture of boiler plate in the United States has run the gamut of the series of processes developed for the making of iron or steel. The demands of industry and the cooperating efforts of the technical and practical research have brought about the present developed state of the art of steel making. The use of specifications and the inspection of materials for boilers and pressure vessels have kept pace with the development of production methods with the result that higher quality and greater operating safety is now assured.

Among the early requirements, as in 1817, it is found that the specifications called for boilers to be made of wrought iron instead of cast iron or copper, the materials previously employed. Thus, we have an example of a definite change in boiler plate material.

Until 1838, boilers were rarely worked above 10 lb. per sq. in., and the usual pressure was something less than 7 lb. per sq. in. Then the pressures were increased to 30 and 40 lb. per sq. in. and inspection recommended; but not required, of course. From 1864 to 1869, there were 288 boiler explosions; 36 per cent of the failures were due to defects of construction, either of materials or workmanship, and 25 per cent resulting from neglect during the operation of the boilers.

This not only indicated the need of improvement in materials, but also the necessity for regular competent inspection. In a short period, thereafter, the convincing proof of the value of inspection was a fact. In 1881, it is reported that of the 15,000 boilers regularly inspected, there were only two boiler explosions.

From the standpoint of the boiler plate material itself, the use of wrought iron for boiler plate was a decided improvement over the previously used cast iron and possibly some of the so-called charcoal iron. Although wrought iron was soft and resisted shock, and therein lay its preference over the hard and brittle cast iron, it still left much to be desired because of its low strength, the limited size of the plates that could be obtained, and the quality of the material itself.

The significant period in the boiler plate industry must have been around 1860 when bessemer steel was being introduced and the Siemens-Martin, or open hearth process, was being developed. Also, in this period, the Lake Superior ore beds were discovered and the coal fields were being opened for the production of coke which soon replaced charcoal in the ferrous metals industry.

It is claimed that as early as 1855 the boilers on the Mississippi steamboats were made of steel produced by Kelly's pneumatic process, the contemporary of the bessemer process. By 1875, Holley had produced boiler plate made from bessemer steel that could be flanged backward and forward and doubled upon itself. Since the interest herein is on quality, the development of paramount importance was the Thomas-Gilchrist process, introduced in 1883 making possible the basic production of steel wherein the removal of phosphorus and to some extent the sulphur was effected.

Also during this period, considerable attention was being brought to bear on methods of testing boiler plate material. In 1875, when the United States Government began requiring that plates used in construction of steamboat boilers be stamped with their tensile strength, the Lukens Steel Co., having been the first mill to roll boiler plate in America, purchased a testing machine and began investigating the physical properties of iron and steel. The new testing machine at the Watertown Arsenal was supplying much needed information on the new mild steel by 1882. The American Society of Testing Materials held its first meetings in those years.

Manufacturers, fabricators and users of boiler plate wanted specifications that would be applicable to all suppliers so that the material could be ordered and made to definite requirements. A uniform test program had to be devised, and in spite of the fact that many different groups were represented in the preparation, a general similarity in the specifications was apparent.

The manufacture of boiler plate steel is carried out in the basic open hearth to practically the exclusion of all other steel making processes. There are many factors contributing to the popularity of the basic open hearth with respect to the quality of the product. Likewise the open hearth was a commercial success as the large percentage of discard and other scrap accumulating around a steel mill and the fabricating shops could be added to the raw material charge and be remelted. From the standpoint of quality, the open hearth lends itself readily, because the charge once melted can be kept in that condition while fluxes and other materials are added until the analysis of the melt has attained the right chemistry to give the desired physical and engineering properties.

The open hearth control extends to the pouring pits where the design of the ingot molds is of considerable importance, as is also the temperature and cleanliness of the molds prior to pouring. Hot tops are used to keep the top of the ingot in a liquid state for a sufficient length of time to allow the steel to expel its impurities and gases into this hot top section that is later discarded in the rolling mills.

The pouring operation must be so

PLATE

ROLLING a 110,000-lb. ingot, 40 in. thick—the largest and heaviest ever made by Lukens. The final product will be a rectangular plate 200 in. long, 170 in. wide and 9⅛ in. thick, weighing 87,090 lb.

carried out to prevent splashing of the hot metal along the sides of the molds, in order to avoid scabs on the surface of the finished plate, as well as an unusual amount of conditioning of the slabs.

In our opinion, bottom pouring produces a better plate surface by regulating the rise of metal in the molds in filling a group from a center runner feeding to the bottom of the ingot molds. A strong skin is then formed on the ingot, preventing cracking and the formation of scabs on the ingot.

After the ingots of boiler plate steel have solidified, they are removed from the molds, reheated in the soaking pits and rolled into slabs that are approximately one half the thickness of the original ingot. These slabs are allowed to cool and inspected for surface imperfections. Such defects are removed by chipping or with the acetylene torch and even machining the slabs is resorted to at times.

Each boiler plate is inspected after rolling and tensile and bend test specimens taken from every plate in accordance with the requirements.

In addition to the ASME S-1, or 33,000 to 65,000 lb. per sq. in. tensile grade, there is now available a group of steels of higher tensile properties. Greater service pressures and temperatures are possible by the use of the high strength steels, thereby employing less thickness than if the lower tensile grade were used. The 70,000 lb. per sq. in. minimum tensile steels have been adopted for many vessels and the forming and welding of such material has assumed regular shop routine. Most of this steel has gone into vessels constructed in accordance with paragraph U-68, requiring X-raying and stress relieving.

The experience of the writer's company with specifications for boiler plate steel dates back to the beginning of its use. The original requirements were similar to the common mild steel grade of the present, calling for approximately 55,000 to 65,000 lb. per sq. in., with proportional yield point and ductility values. However, the steels of later acceptance, no doubt, are of more interest in that higher physical properties obtained by these plain carbon and low alloy steels have affected to some extent the fabricating procedure through the introduction of welding.

By a combination of chemical elements, the desired physical properties are obtained not only in the plate material, but also in the deposited weld metal. There are a number of welding rods available for the higher tensile steels with possibly as many varieties of chemistry in their make-up.

In conclusion, the industry has come to accept the 70,000 lb. per sq. in. minimum tensile steels for pressure vessels within the past few years, and while they have brought some welding and other fabricating problems, these problems have been overcome and shop procedures have been established. There are now other alloy steels available and it may be that at least some of these will be incorporated into the existing codes. Some go beyond the present range to 90,000 and 100,000 lb. per sq. in. tensile strength, and though it is to be expected that their fabrication will require careful control, experience and research can develop the methods of operation.

There are limitations on the size of boiler plates that can be made, but the needs so far have been satisfied. For example: One fabricator has received carbon-molybdenum plates that are 387½x95x4.66 in., weighing 50,000 lb. a plate. The ingot weight for each ingot was 90,000 lb., yielding 53 per cent of plate material.

* * *

The writer is indebted to Charles L. Huston, first vice-president of Lukens Steel Co., for his help in the preparation of this paper. Mr. Huston, who joined Lukens in 1875, was in charge of operations for many years. He is an authority on the manufacture of boiler plate, and remains in active service today after 64 years with the company.

WHAT'S YOUR

By H. BARRETT ROGERS
Assistant Professor of Industrial Engineering, Purdue University

o o o

THE question of "how much" your job is worth has been one of management's problems for many decades, but that question of "why" a certain job is worth a certain amount of money has become so important during the last 10 or 15 years that it has reached almost the proportions of a plague.

As in most cases when industrial engineers have some definite problem to solve, the first approach is an investigation of previous and present facts concerning the problem, and the selection of some means or measuring stick for the analysis of these facts. The present situation in this problem seems to be the quest for that measuring stick, as evidenced from the fact that since about 1922, some 40 or 50 different plans of job rating have been published in some form or other; and there are probably twice that many more that have been written and used to some extent but which have not been brought to public attention. In the days of the so-called "efficiency experts," such men as Taylor, Emerson, Barth, Gantt, Halsey and Merrick were all trying to develop new methods of wage payment, either as a matter of personal publicity or in honest attempts, on their parts, to meet the peculiar conditions of some individual problems. As it has turned out, all of these plans are fundamentally similar, differing only in minor details in the method of administration. And now there is again a flood of job rating plans, each one developed because the author felt that his plan was the only one which could adequately fill his particular need.

But what are the details of this problem for which a solution is desired? What is the purpose of all this frenzied activity in developing job rating plans?

There is, in every industry and almost every company, a variety of jobs which must properly be filled so that the company can function smoothly. Perhaps no two of these jobs are exactly alike. Some of them are widely different in nature or type of work, yet the degree of training or skill may be relatively equal. The same general type of operator could fill any of these jobs (although perhaps not be easily interchangeable). A general level of supply for that level of operation is found, and about the same level of wages is paid for all these different jobs. On the other hand, there are also many different levels of work in the same general type of operation, requiring different degrees of skill and training.

Thus, there are two major wage problems—first, to pay the same general level of wages for all operations requiring about the same degree of skill and training; and second, to pay different levels of wages for operations requiring different degrees of skill and training. But, it is most important that these different levels of wages be paid in about the same proportion as the different degrees of skill and training are required on the jobs. Once it is known *how much* more skill or training one job requires than another, it is not difficult to allocate relative amounts of money for these differences. The trouble has always been in the measuring of these different job requirements.

From this general statement, it should be most interesting to list some of the results which should be expected from the proper solution to this problem:—

(1) Show the relative value (based on requirements) of all present jobs in a company or industry, between jobs in one department, between departments, and between hourly paid and salary paid jobs.

(2) Determine the relative value of any new job.

(3) Convert these relative values into correct actual or real money values, for it is the amount of money an employee takes home in which he is finally interested.

(4) The application of the plan should give consistent results in a variety of times, places, and conditions.

Some secondary results to be expected from the installation of the plan are as follow:—

(1) Prevent inequalities of wages for similar work, to eliminate or reduce individual employee dissatisfaction.

(2) Standardize present jobs in order (a) to clarify the requirements of each, and prevent inefficient overlapping of duties; (b) to provide a clear-cut and adequate basis for promotion.

(3) Improve employer-employee relations by providing adequate means of intelligent arbitration of wage questions.

If the actual or real values are too high, the unnecessary excess wages mean higher costs, inability to meet competition, reduced profits or actual losses, and perhaps eventual elimination of the enterprise. If the real values are too low, the employee's standard of living will be lower than should be necessary for his particular occupation, the desirable employees will leave,

JOB WORTH?

and the general quality and production level of the enterprise will be reduced.

During the latter part of 1938, the Personnel Department of Purdue University contacted 80 different companies by letter in an attempt to get a true cross-section of what has been accomplished in actual practice in job rating. Sixty-three replies were received, in which 31 companies admitted they had made no attempt at any job evaluation procedure. Thirty-two (or about 50 per cent) had some form of job evaluation procedure, although five were very informal, leaving 27 that were to some extent formally organized. In this group of 27, 17 (or 63 per cent) were based on some form of Point Rating Systems, the balance being based on the Ranking type of classification.

Operating Without Plan

The procedure followed in the "informal" plans seemed to be, "to cooperate with other manufacturers, getting the breakdown of jobs and the rates for each classification of work, and letting this govern the wage rates of the individual company." As an indication of some of the difficulties toward which a plan of this sort might lead, a statement may be quoted from one of the large steel companies re-

WHAT is the purpose of the recent frenzied activity in developing job rating plans? What results should be expected of a proper plan? How do Ranking and Point Rating plans function? All these questions are answered in this first section of a two-part article.

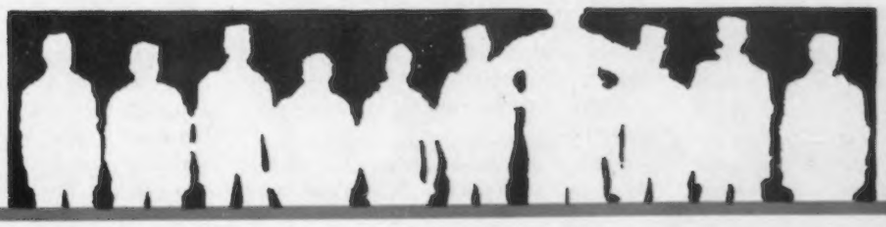
garding wage surveys in competitor companies in the local communities where this steel company had branch plants. "From these comparisons, we learned that the comparative rate situation was as aggravated as our own; that even in the same community, the differences in wages for comparable jobs varied frequently as much as 50 to 100 per cent; that we could justify, on the basis of such comparisons, ANY rate that we were paying or could select; and, that the 'going' or prevailing rate for any particular class of labor could be determined only within such wide limits as to render the comparison valueless as far as being an aid to the selection of correct rates." The same situation existed both in the plants of this steel company and in those of their competitors, namely that their job nomenclature was not standardized, which resulted in corresponding inconsistencies in rates, and that their base rates and bonuses were not uniform. The author believes this clearly indicates the conditions in most companies where some formal plan of job rating has not been established.

Types of Plans

The more formal plans logically fall into two general classes: First, the ranking, classification, or grading procedures; and second, some form of point rating. The poorest of these methods properly administered might be satisfactory, and the best of them poorly applied would be equally unsatisfactory.

Ranking or Grading

The simplest method, of course, consists of sorting the names of the jobs, just as a deck of cards may be sorted, until by general good judgment they have been arranged in the order of increasing importance. A slightly more complicated program would be to set up a number of levels, or grades, or classes, with a general description for



o o o

IT is most important that different levels of wages be paid in about the same proportion as the different degrees of skill and training are required on the jobs. The important thing, however, is the determination of how much more skill or training one job requires than another. Photo courtesy of Armco.

o o o

each class, and to sort the jobs into these various classes. In either case, this sorting or ranking may be done by an individual, a group of individuals or a committee, or by averaging the rankings from several individuals working independently, giving what some call "Pooled Judgment." The grades or classes *may* be set up *before* the sorting is done and the jobs sorted to those classes. In most cases, however, the sorting or ranking seems to have been done first, and the grades or classes determined from the results of the ranking. Usually a few KEY jobs are used as anchor points or guides in order to divide the total range into smaller units.

Eventually this arrangement of jobs must be tied up with some scale of wages, and this is usually done in one of two ways. The first method is to plot the average rate for the highest and the lowest jobs along some uniform scale and draw a straight line between these two points, assuming that all jobs between these two will be distributed equally along this line. The second method is to assume that the selected classes or grades are of equal range and divide the difference between the lowest and highest rates equally over the number of grades selected.

There are some advantages to this type of procedure. It can be done rather quickly, provided too good a job is not required, and there is a corresponding low cost of installation. It is simpler, as a whole, and easy for the foremen and workers to understand; it is less theoretical and less mechanistic than a point plan; and, some persons maintain that it is based on the same judgment as is used in any point system.

The disadvantages, however, seem to outweigh the advantages to such an extent as to make this type of procedure undesirable for anything except a logical step in the development of an adequate point system. For example, in these ranking procedures the engineer doing the ranking assumes that he knows of what a job consists, and there is a corresponding tendency to dispense with good thorough descriptions of the jobs. The decision for putting a given job in a certain relative location, therefore is based upon overall opinion of the job's worth, and it has often been found that the worth of a given job is widely different in the opinions of different experienced analysts.

If a committee is used for this ranking procedure, usually much time is consumed in arguments over generalities because of the different individual opinions. Thus, the final arrangement still may not show the correct relative location of the job in the list. The final arrangement may show that one job is worth more than another, but by the nature of the system, it cannot show *how much* more. It may be relatively easy to compare similar jobs within any general type of occupation, but it is very difficult to compare jobs of widely different types although they may actually be worth about the same amount. This system assumes that the existing rate relationships between the selected key jobs is correct, although they may later prove not to be correct. The knowledge of existing money rates leads to juggling the jobs to suit the rates rather than to impar-

tial consideration of the actual job. And it is difficult to make comparisons between plants.

Factors in Point Rating

Fundamentally, all of the point rating plans were quite similar. They all used a series of factors which are intended to be fundamental characteristics of any and all jobs to which the plan might be applied. All of the characteristics found could be classified under one of three general headings—mental requirements, physical requirements, and the job or working conditions which affect the operator but which usually are beyond his immediate control. However, many of the factors commonly used are so dependent upon the coordination of both physical and mental facilities that they are hard to classify under either one. Such factors, which are usually improved by increased knowledge and physical training, can perhaps more easily be classified under the term skill; hence this factor of skill or experience is used in nearly all the plans except the more complicated ones which recognized it by breaking it into its component parts, such as dexterity, precision or accuracy, versatility, acuteness of senses, etc. Likewise the term "responsibility" might be classified either as a mental characteristic or as a job condition, but it is so commonly recognized as an essential factor that it appears as such in nearly all the plans.

Thus, there are found five fundamental factors on which nearly all plans agree, which follow:—

(1) Mental requirements.
(2) Physical requirements.
(3) Skill.
(4) Responsibility.
(5) Job or working conditions.

In addition, the plans vary in the number of factors from this minimum of five up to as many as 26 characteristics.

Obviously it takes longer and costs more to consider 26 separate factors for each job graded than it does to consider only five. It has been found in time study work, however, that better control is obtained, and probably at less cost in the long run, when studies are made and the rates are set on fundamental elements which can be analyzed and standardized rather than on over-all time studies or production checks. Similarly, it is reasonable to expect better control of wage rates by the more thorough analysis of each job, provided the factors requiring this additional work are wisely chosen. The cost of installation (and maintenance) of a job rating program will obviously increase with the increased refinement of the procedure, but the results in correct wages and improved personnel relations will likewise vary in the same proportion. It is up to the employer to decide how good a job he wants.

Number of Points Used

Considerable variation existed also in the number of points assigned to each of the various factors. These varied from 85 points available for the highest paid job, up to 2500 maximum possible points. And that brings up another point—that so many of the plans, by placing a limit on the maximum number of points available, limit the scope of the plan to only those jobs around which it was constructed. Any general or reasonably universal plan, therefore, MUST NOT have a top limit to the number of points available. But, returning to the number of points for each factor, several plans are available where the number of points are approximately equal to the number of cents per hour in the final rate. One example of this is sometimes called the Job Factor Comparison Plan where the cents per hour were deliberately taken as the points for each factor. In other plans using approximately the same number of points, the relation is more arbitrary, and a conversion curve is necessary to correlate points into money. This latter type has the advantage of more independent consideration of the individual factors, with less chance of being influenced by opinions of money values, although the original selection of the points for each factor is more difficult.

Another group of plans has point values based around some multiple of the number of cents per hour. Probably the outstanding example of this is the General Electric Plan as published by Mr. Weed which starts with a base of 400 points, representing 40c. per hr. (which was the minimum rate at the time the plan was written), and each four points above this figure representing 1c. per hr. above the minimum rate. Most of the other plans seem to have set up the points on a purely arbitrary basis for each factor, with no attempt at correlation between points and money until the jobs are rated.

It must be admitted that all of these plans have been applied in actual practice, and most of them with at least a certain degree of success. This indicates rather conclusively that the actual number of points assigned to any characteristic has very little bearing on the final result, provided, of course, that the points are distributed in the proper *percentages* to the characteristics considered. This is difficult to set up because the proportion that each factor should carry in relation to the whole job will vary with every different job. It might be assumed on the *average* job, however, that the various factors should always carry *about* the same percentage of the total weight. Then, if some maximum number of points is assumed for a plan (an assumption that is fundamentally wrong) then these total points can be divided to the various factors on the basis of these arbitrary percentages. Thus, it was in this manner that the latest Westinghouse Plan for hourly rated employees was developed.

Distributing of Points to Factors

In this Westinghouse distribution 65 per cent weighting was given to knowledge and training; this included basic education; knowledge of methods and equipment, or experience; initiative and ingenuity of manual skill or ability.

Twenty per cent weighting was given to specific demands of the job, including: Physical application; mental or visual application; unusual features.

Fifteen per cent was given to responsibilities involved, including: Equipment; product; safety of others.

Any maximum number of points might be chosen to be segregated according to these percentages, but 500 points was chosen arbitrarily; first, as a convenient figure; and second, because jobs graded on the basis of this number of points would have comparable point values with jobs graded according to the NEMA plan which is rather widely distributed through the Eastern industrial area.

Although these percentages are purely arbitrary opinions, they represent the joint opinion of a committee of several men, each of whom had considerable experience in the administration of job rating work. These percentages seem to represent about the normal weighting of the corresponding relative factors in most of the plans.

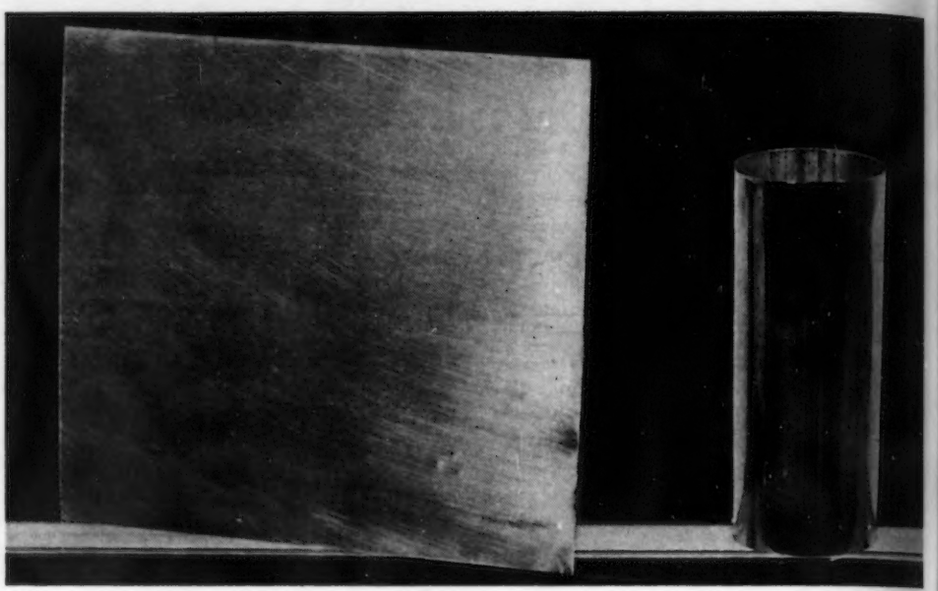
Regarding the method of presentation and the application of the plan to the actual grading of a job, all of these plans seem to fall into three general types.

Ed. Note:—Next week the author will describe these three general types of presentation and application, and will go on to set forth the factors influencing the choosing and installation of a plan, the cost of installation and administration, etc.

o o o

PRECISION rolled stainless steel strip, and electric welded tube made from the strip. Note the numerous overlapping spot welds making up the seam weld.

o o o



Stainless Steel

By electrical resistan echn
18-8 strip is formed i ubin
being ± 0.00015 in. co
fittings are join o th

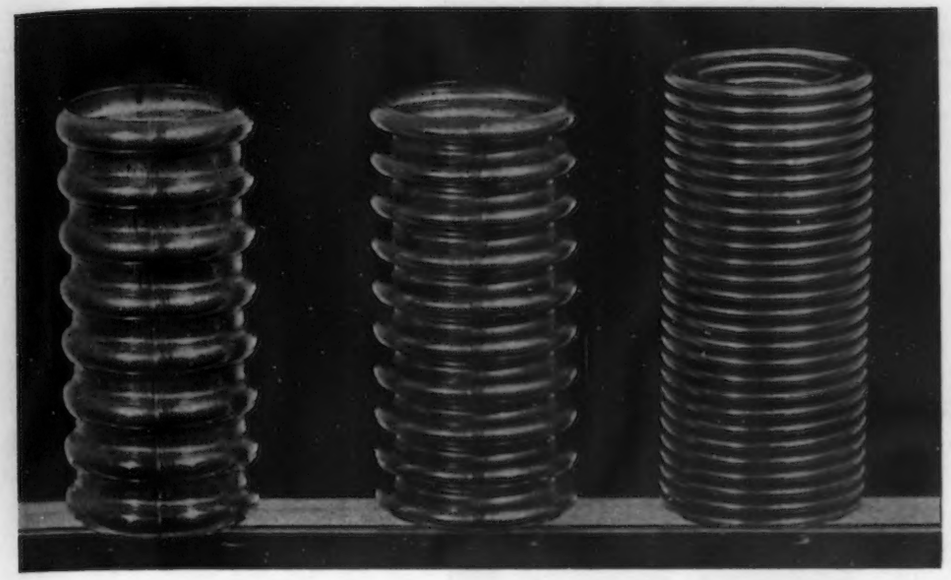
ADVANCES and developments in the art of electric welding have made possible the economical fabrication of extremely thin gage stainless steel tubes. Considerable difficulty in drawing long lengths of light gage stainless steel tubing is attributable to the work hardening characteristics so pronounced in the austenitic alloys. Considerable care must be exercised to lubricate correctly to prevent the metal from tearing, and a number of anneals and pickles are involved to get the tubing down to a small diameter and with a thin wall.

Obviously, this practice is comparatively expensive. Rather than drawing, continuous lengths of precision rolled 18-8 stainless strip are now formed into 50-ft. sections of tubing by means of a highly specialized electric resistance welding technique. The thickness of the material used may be as fine as No. 40 gage, which is approximately 0.003 in. Tubes made from this thickness of strip vary from approximately ⅜ in. in diameter upwards to 2½ in. diameter, in which range material of 0.006 in. thickness is used. Inasmuch as these tubes for the most part are subsequently made into corrugated tubing or bellows, a consistent thickness of the material is of paramount importance. Extremely close tolerances are required which permit as little as 0.00015 in. variation in gage, plus or minus from the specified stock thickness.

The type of stainless steel used can be chosen from a rather wide range of stainless steels which is currently commercially available. Type 304 is generally preferred, the analysis being 17 to 19 per cent chromium, 8 to 9 nickel, 0.08 maximum carbon, and the balance iron.

The flat material, or strip to be fabricated, is taken from large coils of dead-soft annealed, pickled stainless steel. The strip is run through an oil bath and upon emerging is practically wiped clean, there being only a thin film of lubricant adhering to the surface of the metal. Subsequently, the strip is drawn into a combined tube forming and welding apparatus. This machine receives the flat strip at one side, at which point it is drawn through a continuous forming die which shapes it into a tubular form. The strip is so specified that its width is approximately 1/16 in. wider than the circumference of the tube which is ultimately formed. The 1/16 in. excess provides sufficient overlap for the welding to take place. Continuing through the machine, the strip passes into a die which adjusts the diameter accurately and thus governs the degree of overlap which the strip edges have formed. From this point the material is now ready to be welded, and passes into the welding-head where a narrow-faced electrode-roller contacts the lapped portions and, with the aid of suitable back-up tools which act as the other electrode, an electric current passes through the lap into the tube interior. Thus, the welding takes place. There are no flashes, sparks, or outward signs of heat generation. Continuous with the welding operation, a spray of water is directed upon the work—this is important in maintaining a constant welding electrode temperature.

With regard to the circuit arrangement which accomplishes the welding,



THE three operations in the formation of bellows from welded stainless steel tubing.

Tubing

By D. WENDELL FENTRESS
Development Engineer, Chicago Metal Hose Corp.

...chnique, precision rolled ...bing, the gage variation ... comparable manner, end ... the tube.

the following might be said: Standard 220-volt line current passes through a transformer and reaches the welding electrodes at two to four volts and approximately 2000 amp. Various taps are provided on the transformer so that a fine adjustment of current can be obtained. For best results a current interrupter is used in the circuit, its function being to provide a rapid series of individual current impulses, each of which forms an individual spot weld between the lapping layers of stainless steel. The interruptions are so timed and are so synchronized with the speed at which the tubing is drawn through the apparatus, that a continuous chain of spots, each of which overlaps the preceding spot, is formed. This continuous chain of overlapping spots results in a seam weld of any desired length, possessing approximately 23 spots to the inch. Such welds are both gas and vacuum tight.

The welding is accomplished with such rapidity that heat cannot dwell in the metal body for a sufficient period of time to bring about carbide precipitation. It is a well known fact that austenitic stainless steel when heated to an unstable range, which is slightly above 1000 deg. F., for a sufficient period of time displays a tendency for some of the carbon, which properly is in solid solution with the other elements, to combine itself with the chromium, and to precipitate in the grain boundaries in the form of chromium carbide. Certain parts of the grain are thus impoverished of chromium, and the steel has lost its chemical balance and thus its stainless characteristics are impaired. The welding technique employed in this operation does not permit this harmful precipitation to take place; for the speed at which the welding takes place, together with the rapid cooling of the welded seam, precludes any possibility of "weld decay" from taking place due to the time factor.

Emerging from the welding head, the tube is sized or calibrated to a precise diameter, the tolerance being approximately plus or minus 0.0005 in. The entire operation is continuous, and 50-ft. lengths of straight welded tubing are fabricated in a single operation cycle. All products from this machine must be handled with extreme care, and all tools must be accurately machined and carefully maintained so that a perfect product emerges from the welder. In the smaller diameters, the tubing is so light that a 50-ft. length will weigh but 13 or 14 oz.

Tubes Are Corrugated

The welded tubes subsequently are fed into combined punching and spinning equipment where, by means of tools working from within as well as from without, a series of convolutions are formed circumferentially on the tube wall. Again, it is essential that extreme care be exercised in forming this material. The formation of the convolutions takes place inward and outward from the mean tube diameter, thus limiting the amount of stretch and the cold deformation to a minimum which the material must bear. The depth of the convolutions which are formed within the tube are equal to one-fourth or one-fifth of the inside diameter of the tube itself. The weld which runs perpendicular to the convolutions is subjected to stretching at

the tops of the convolution and compression at the base of the convolution. The weld has proved itself to be as ductile as the rest of the metal, and lends itself perfectly to cold forming operations. Each foot of the flexible corrugated tubing is made from four feet of straight tubing, thus illustrating the collapsing or folding action that takes place in the formation of the convolutions.

Despite the lightness in gage, the stainless material possesses great strength when formed into its corrugated shape. Though the tube made into bellows or a flexible hose will lend itself to bending radially or elongating and collapsing on its own axis, it has extreme resistance to internal pressure or external forces which may tend to crush it. For instance, a flexible tube with an inside diameter of ⅜ in. and wall thickness of 0.003 in. will take a pressure of over 3000 lb. per sq. in. before bursting. Inasmuch as the thickness of the metal is held to a minimum, the amount of fatigue which occurs in the body of the metal is also limited. This is true because as a convoluted tube takes flexation, such flexation is afforded by small amounts of bending on the part of each convolution, and the thinner the metal which is being flexed, the less fiber stress is thus imparted, and accordingly the less tendency towards work-hardening occurs. Thus the importance and reason for the use of extremely thin-gage material in the flexible metal tubing where the bending of the metal body itself affords the flexibility.

End Fittings Welded

No flexible tube is complete without some form of end fitting which makes possible the attachment of the tube to the machine or device for which it is intended. End fittings have heretofore been attached to the open end of the tube by means of brazing, soldering, flame welding, or clamping. Modern industrial needs for flexible metal tubing prevent in many cases the use of flexible conduit whose interior is not 100 per cent corrosion resistant. Obviously, the brazing or soldering of end fittings to tubing or to bellows may leave areas on the inside of the tube at the coupling point which are not so resistant to chemical attack as is the stainless steel. On the other hand, high temperature applications may impose certain difficulties when brazing alloys are used. Thus, the tube manufacturer has the problem of attaching end fittings to the tubes, in which the joint is 100 per cent as heat and corrosion resistant as the tube metal itself. The author is of the opinion that flame welding technique for the attachment of end fittings of stainless steel to the stainless steel tubing does not give the answer, even though the material which is used in the welding operation may be of the same analysis as the tube material and coupling material itself. This is true because of the extreme delicacy of light gage stainless steel and the difficulty of carrying out the proper welding technique without injury to the thin metal.

ELECTRIC resistance circumferential seam weld joins the bellows neck to the stainless steel nipple.

o o o

A recent development of the Chicago Metal Hose Corp. has made possible the attaching of end fittings to tubing (or to bellows made from the tubing) by means of electric resistance welding. The nature of this welding is basically the same as that discussed earlier in this article. At the end of the tubing or bellows there is spun a cup shape extension whose walls are parallel to the axis of the tube. Into or onto this cup shape extension is inserted the end fitting, whether it be a standard nipple or flange or specially designed coupling. The section of the coupling member which is inserted into or over the prepared end of the tube or bellows is machined so that its wall thickness at the point of insertion is approximately four or five times the thickness of the metal in the tubing wall. These two parts snugly telescoped together are inserted into especially designed welding machine, in which external and internal electrodes are used to accomplish an electrical resistance circumference seam weld. Whereas the welding in the former discussion ran longitudinal with the tube axis, this weld runs perpendicular to the tube axis and describes a complete chain of welding points about the entire circumference of the tube end, sealing it completely to the coupling member. The heat input in this work is so controlled that the harmful carbide precipitation previously discussed is avoided, and, furthermore, there is absolutely no chance of the active convolutions of the tubular unit becoming heated or injured in any manner. The operation is quick, efficient, and eliminates practically all the human element which normally enters into other welding procedures.

Under a constant spray of water, the two electrodes which accomplish this welding are motorized and feed the work between them in a circumferential manner at such a rate that the overlapping or welding spots form the desired chain of welding points throughout the circumference and provide a complete vacuum tight seal. Inasmuch as heavier metals are used in the coupling member, slightly higher currents are required. In cases where extra strength in the tube is required for high pressure work, a two-ply construction in the tube is offered. This two-ply construction is made possible by telescoping two straight tubes together before they are passed into the corrugating apparatus. The two tubes, acting as one tubular unit, are formed in exactly the same manner as is the single ply construction. For extreme pressures three-plies are used, and regardless of the construction of the tube, that is, single, double, or triple ply, the electric welding of the end of the tube onto the coupling member or the end seal is still possible. The current is so adjusted that a complete bond between the three plies of the metal and the coupling member is simultaneously effected.

THE latest streamlined version of the Miami register has a cover section molded in ivory Plaskon, a urea plastic, a base of brown Durez, a phenol-formaldehyde resin, and a light yellow operating handle also molded of Plaskon. The chassis is largely made from sheet metal stampings.

LONG in commercial use has been this Miami autographic sales register, shown with a drawn aluminum case for lightness in weight.

PLASTICS FOR STAMPINGS

By HERBERT CHASE

o o o

METAL fabricators naturally make the most of metal applications in their product, but when they can realize unquestioned advantages by using some parts nonmetallic in character, it is hardly advisable to let a disposition to employ metals stand in the way of policy change. Plastics, for example, are both a natural and a valuable supplement to metals. Failure to take note of their utility may make a great difference in the salability and serviceability of a product. How one maker of business equipment gained by a compromise between metal and non-metal parts is briefly reviewed in this case study.

Krauth & Benninghofen, of Hamilton, Ohio, have made autographic sales registers for some years, all of metal. For portable use in truck deliveries, a drawn aluminum shell was employed and this was welded to the chassis for further weight reduction and stiffening. There were, however, several drawbacks to this design. If abuse distorted the case unduly, a return to the factory was necessary for a new case, or else the operating mechanism was thrown out of gear and a return had to be made for that reason. Welding of the chassis to a sheet metal case made it necessary to assemble parts of the chassis after welding and to work inside the case, which involved difficulties and made it hard to hold certain dimensions as close as desired. A piano-type hinge held the two parts of the outer case together, with a catch on the other side. This was a relatively expensive feature.

The design of a plastic case was approached with improved appearance the primary consideration, but it was found that many other advantages could be realized. Some of these are summarized briefly as follow:

(1) A natural finish is attained, not easily scratched or chipped; noncorrosive; and pleasant to touch.

(2) A stiffer case, held within closed dimensional limits and including ledges with integral bosses with threaded inserts for fastening the chassis base without holding screws showing on the outside.

(3) Use of Rathbun spring clip hinges which are easily and quickly snapped into place in molded recesses, eliminating the need for separate latches.

(4) Decrease in cost of tooling (molds vs. dies) and in the total part cost.

(5) Housing cannot be dented. Broken cases can be replaced at moderate cost without necessity of returning register to factory unless chassis is damaged, which is unlikely.

(6) Sharp detail and fully satisfactory contours are possible.

Although the greater stiffness of the plastic case is attained by reason of a heavier section and by the use of integral ribbing not feasible in a drawn case, there is not a material change in weight since the plastics employed have a specific gravity about half that of aluminum.

A quite different set of conditions apply to the interior parts, a large portion of which are stampings involving simple blanking, bending and piercing operations and a limited number of welds for assembly. Appearance ceases to be a factor of importance and the use of light gages makes the stamped parts inexpensive and quite satisfactory.

Taken as a whole, the design represents one in which advantage is taken both of the characteristics of the materials used and of the conditions by which they can be fabricated advantageously. The author designed the case in collaboration with Harry J. Waechter, who is responsible for most of the mechanical development.

SPECIAL TIPS FOR "PERFECT" GROOVES

ONE of the difficult tasks of automotive machining has been that of attaining satisfactory grooves for piston rings. Recently it has been accomplished easily and on large volume production through a new approach to the subject of tool design and maintenance practice. The accomplishment indicates a fundamental of grooving tool cutters and is, for that reason alone, of broad interest wherever grooving cuts must be made.

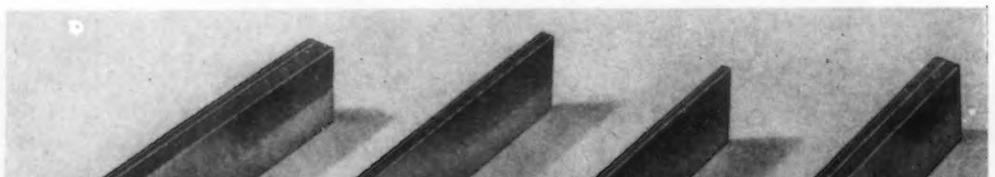
Better to understand the solution, it is of value to set down what the piston manufacturer means by a satisfactory ring groove, unhesitatingly referred to in the trade as "perfect".

Like most demands for accuracy, this one is based on performance experience which dictates standards. In this case it is necessary to machine grooves, narrow and true, which will permit seating of rings so they will resist the high pressures of hot gases and their attempts to escape from combustion chambers by blowing into the crankcase. So a "perfect" ring groove in production is commonly understood to be correct to size within 0.0002 in., with the sides of the groove parallel within 0.0001 in., square within 0.0001 in. and free from "snakiness". Along with this, it is considered essential that the groove be smooth and flat, with a good finish.

In production, particularly, it has been both difficult and expensive to maintain conditions which would produce such results. The difficulties in conventional set-ups have been attributable to improperly shaped tool tips and sometimes to warped tool shanks, but credit must be given to Ex-Cell-O Corp., Detroit, for its deliberate probing and solving of what has been a vexing problem.

In conventional practice, tungsten carbide tipped grooving tools have been used, and in this respect there has been no change proposed. But conventional tools have had the tip the same width as the shank, with no back taper to relieve the sides. The new design makes the tip slightly wider than the shank, and the tip is sharpened with slight back taper and with slight relief under the cutting edge.

The practice has been to grind the tool blank—the tip and the entire length of the shank—at the same time, usually on a surface grinder. Next, the shank under the tip is ground away for relief. To put a keen edge on the tip and to size the tool, the final operation is hand lapping, which requires skill to produce a flat, straight cutting edge. This design calls for, (1) very straight sides, and (2) tools fed into the work at a perfect right-angle to the centerline of the work. These are conditions not always easily secured.



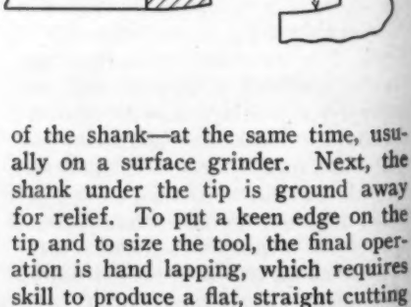
ABOVE

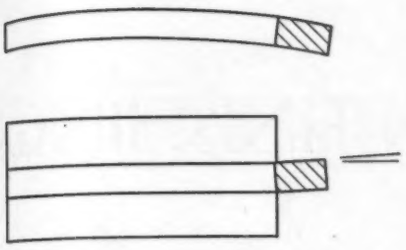
CONVENTIONAL grooving tools have tips the same width as the shank with no back taper (the two tools on the left). After each grinding the thickness of the shank is reduced and new spacers are required. Spacers cannot support the tip of the tool under the cutting edge. The new design (two tools on right) calls for inserted cemented carbide tips wider than the shank, with slight back taper and slight relief under the cutting edge to reduce wear from lapping action. The shank is gage stock and is not reduced in size when the tip is ground. The same spacers can be used after every re-grinding and the spacers are shaped to support the tool directly under the carbide insert, as shown here.

o o o

BELOW

TAPERED grooves like this are produced when the tool tip wears on the corners which do the cutting.





WARPING may cause the tools to be fed into the work at some angle other than 90 deg. to the center line of work. When tools are ground in the conventional manner it is difficult to correct for the warping and, since the tool tip is "ground square", imperfect grooves are produced.

o o o

Among difficulties which are encountered is the fact that as soon as the cutting corner of the tip of such a tool begins to wear, a wedge-shaped groove is cut. However, when the cutting is done at the front edge of the tool, as on the new wide-tipped design, the result is a square groove, without any taper or wedge effect, although naturally an undersized tool produces an undersized groove.

When taper is introduced in the grinding of the tool, it is claimed that it permits free cutting with clearance to prevent rubbing and lapping on the sides of the tool. Of course, a "ground square" tool would be subject to lapping on the sides and, in addition, would be worn if the tool should not be fed in at a perfect right-angle. Under such conditions, one side of the tip cuts and the other drags. This same cutting-dragging action occurs if the shank is warped or bent, a not uncommon condition found in narrow grooving tools.

Here, it is claimed, the introduction of back taper is important. The back taper at the sides of the cutting edge allow sufficient clearance so, even though the tool may not always be fed into the work at a perfect right-angle, still a "perfect" groove can be obtained.

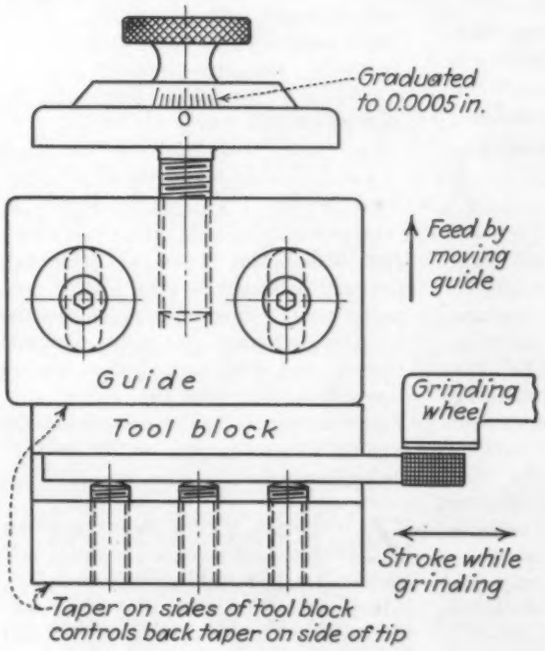
Grooving tools and grinding equipment designed to accomplish the foregoing results are being used in a number of automobile engine and aircraft engine manufacturing plants with success.

The new grooving tools are being made with standard gage stock for the shank, assuring specific thickness. Since the tungsten carbide tip is wider than the shank, and no relief is ground on the shank under the tip, it is possible to fit spacers right up under the tip to give side support under the cutting tip. This prevents the tool from flexing and avoids snakey grooves. After use, re-grinding of the tip has no effect on the spacers, because the shank of the tool is not ground.

A typical tooling requirement is for an aircraft piston of aluminum. The grooving tool for this would have a taper of 0.0005 in. per side in 5/8 in. length of tip. This assures free cutting with no lapping action on the sides of the tool. The back taper allows clearance so the groove is "perfect" even if the tool is not fed into the work at a perfect right-angle. This back taper has the added feature of making it simple to control size. A new finishing tool can be started off cutting at the high limit of the tolerance on the slot, and can be re-sharpened many times before the cut reaches the low limit.

For instance, with a groove size 0.1065 in. to 0.1055 in., and with 0.0005 in., back taper, an eighth of an inch must be ground away to put the tool undersize. Then the tool can be re-ground to a smaller size by as little as 0.001 in. to be used for roughing or for cutting smaller size grooves.

Re-grinding of these tools is accomplished on a standard bench type carbide grinder (Ex-Cell-O) equipped with a special block for clamping the tool. By means of micrometer adjustment of the tool block guides, it is easily possible to grind tools to a 0.0001 in. tolerance. The entire tool is ground without removing from the block. A micrometer gage is used with the tool block to measure the amount of over hang of the carbide blank so that the tool can be ground with the sharpened blank exactly centered on the shank.


Graduated to 0.0005 in.
Feed by moving guide
Guide
Tool block
Grinding wheel
Stroke while grinding
Taper on sides of tool block controls back taper on side of tip

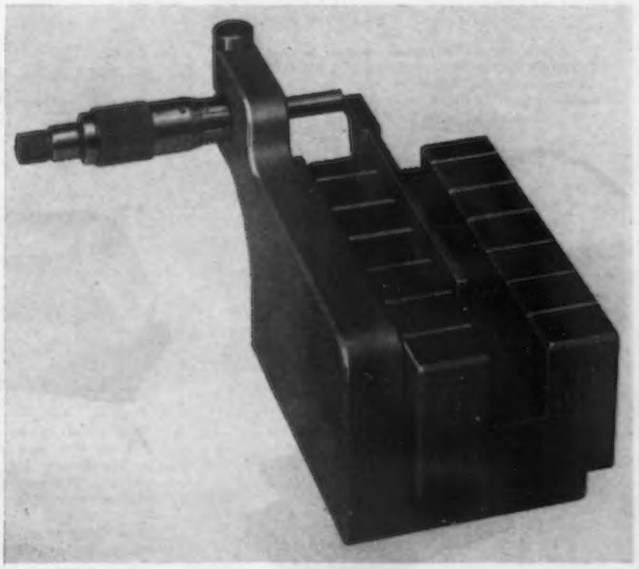
ABOVE

SKETCH of the tool block used on the Ex-Cell-O bench-type tool grinder.

o o o

AT RIGHT

MICROMETER gage developed to measure the amount of overhang of the tip blank so the tool can be ground with the blank exactly centered on the shank.



LATEST OFFERINGS IN FINISHING

SEVERAL new designs of light weight portable sanders have recently been announced, also a large continuous belt sander for sheet steel. New units for cleaning and degreasing steel parts have appeared. In this review of recent announcements of the makers there is also included apparatus for spray painting, conveyor units for dipping and baking, and electroplating equipment. A number of new synthetic enamels have been introduced, as well as a new type of wrinkle finish and two porcelain enamels. An anti-corrosion coating has also been placed on the market in recent months.

o o o

SEVERAL new styles of light weight, portable, power driven sanders have been put on the market in recent months for finishing wood and metal surfaces. Of the three illustrated, two are reciprocating pad types and one a continuous belt machine. The Easy electric sander, made by the *Detroit Surfacing Machine Co.*, 7433 W. Davison, Detroit, is a reciprocating sanding, rubbing and polishing machine, driven by a universal motor. It weighs only 6¼ lb. and uses one-third of a standard size sheet of abrasive paper. Every moving part moves in grease packed and sealed ball bearings. The ball bearing eccentric is sealed in a neoprene boot. Forced draft ventilation is provided the vertically mounted motor, and the fan draws air in through a filter in the motor cap. The machine is said to duplicate the natural back-and-forth motion used in hand finishing.

o o o

ZEPHYRPLANE is the name given a new streamlined 3-in. belt sander introduced by *Skilsaw, Inc.*, Chicago. A belt speed of 1200 ft. per min. is said to give fast sanding and a smooth surface without ripples or ridges. This unit has a die cast aluminum frame and weighs 13¼ lb. A feature is the interchangeable knob handle that can be moved from the top to the nose for greater convenience in sanding vertical surfaces. To speed up the changing of belts, a touch-control lever has been incorporated for instantly releasing the tension on the sanding belt. A pressure control switch in the bakelite handle makes accidental starting impossible. Motor armature and transverse shaft are mounted on ball bearings, while Oilite bearings are used on the idler and driver pulleys.

Grinding and Polishing Machine

IN the new model No. 27-E automatic high speed, twin spindle, electric iron sole plate grinding and polishing machine, built by the *Excelsior Tool & Machine Co.*, East St. Louis, Ill., the operator sits on a stool provided with wheels and track for mobility. Rough castings are brought to the operator on a short length of belt conveyor from which they are removed and placed on the left-hand fixture board. This board carries the work back and forth under a 14-grit high speed grinding wheel. The plates are then transferred to the right-hand fixture board to be finished under a 60-grit grinding wheel or a polishing wheel. Each carriage carries six castings each and is oscillated sideways to avoid straight line scratches on the work. Charging and discharging of the castings can be performed without stopping the machine.

A 15-hp. motor drives the two ball bearing wheel spindles at 2500 r.p.m. through the medium of V-belts. Heavy wheel guards, dust spouts and suction pipes are provided. Carriage travels

THE easy electric sander, made by the Detroit Surfacing Machine Co., sands out under-coats, feathers spot jobs, removes paint or rust and does lacquer, enamel or varnish finishing.

AIR power gives a reciprocating motion to this new type of sander, made by Metalmen, Inc., 12209 Turner Avenue, Detroit. The sander makes approximately 3000 reciprocations per min., using 3 to 4 cu. ft. of air per min., depending upon the pressure. The maker recommends it for all types of sanding, especially where a compound is used for rubbing down surfaces, and for feather edging and spot painting.

SKILSAW'S Zephyrplane is a 3-in. portable belt sander of modern lines. Frame is of die cast aluminum.

EQUIPMENT AND METAL FINISHES

at 25 ft. per min. Approximately 200 to 300 castings can be ground and polished per hr., depending upon the size and required finish.

Solvent Degreasers

TWO new types of solvent degreasers have recently been developed by the *Detroit Rex Products Co.*, 13005 Hillview Avenue, Detroit. Both are automatic machines designed to clean specific shapes of work. To prevent solvent from being trapped in cup-shaped work, for example, the company has designed a one-dip Detrex degreaser in which the work is carried into the hot solvent and out through the vapor area in a basket which is rotated about a horizontal axis. An automatic elevator mechanism raises and lowers the rotating basket. Cycle time is controlled by means of a vacuum tube relay. This type of degreaser is made in various sizes ranging in capacity up to 2 tons of work per hr.

Another new type of Detrex one-dip degreaser has been developed for cleaning cylindrical shaped parts, such as stators and rotors of fractional

By FRANK J. OLIVER
Associate Editor, The Iron Age

o o o

horsepower motors. The machine fits into the assembly line and work is carried through it on pendant fixtures by means of a two-strand conveyor. The work is fed to the degreaser six units wide from a table equipped with guides. The cleaning cycle consists of 2 min. in vapor, 2 min. in boiling solvent, followed by 2 min. in pure solvent vapor. Work is unloaded at the opposite end of the machine onto a platform.

The solvent in the immersion chamber is kept continuously clean by the use of an auxiliary concentrating chamber, the return flow of distillate from the water jacket condenser and a continuous filter applied to the immersion chamber for the trapping of insoluble matter removed from the work. In both types of machines described, the concentrating chamber and the immersion chamber are heated by steam coils, the input of which is automatically controlled.

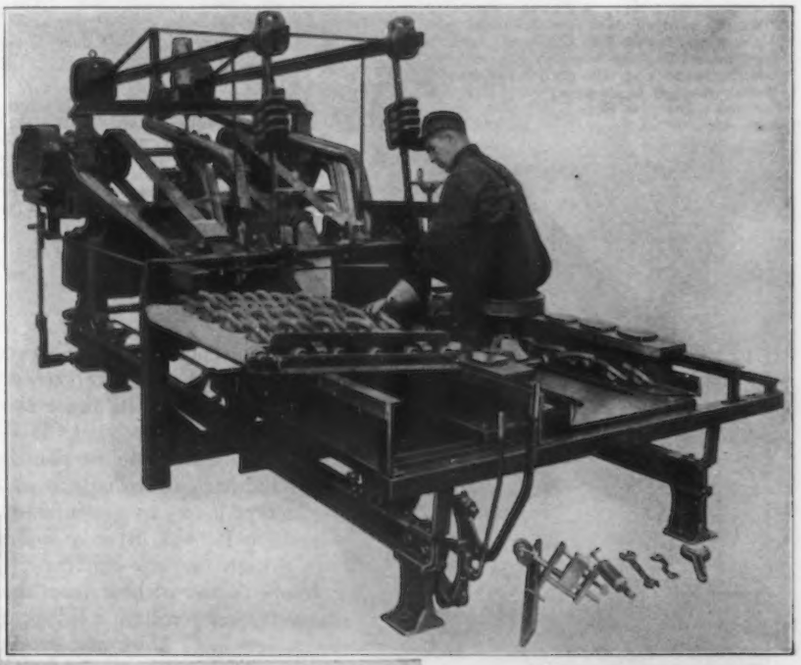
Rotary Cleaning Machine

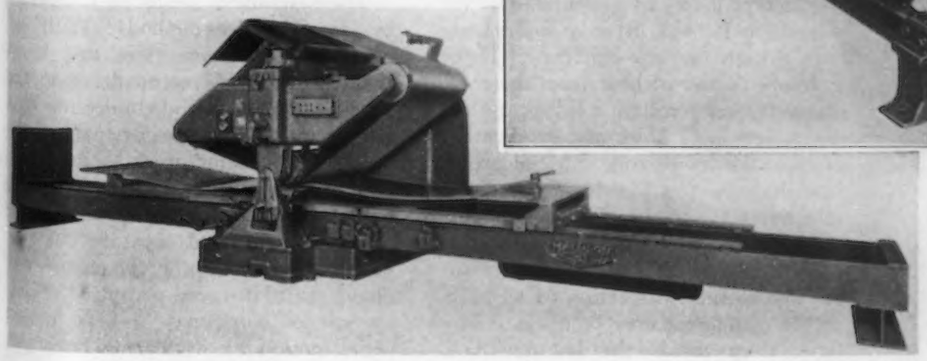
THE Hilbish-McCahan rotary cleaning machine, originally described on p. 33 of the July 14, 1938, issue of THE IRON AGE as an experimental unit, is now being manufactured and marketed by the *Sutton Engineering Co.*, Pittsburgh. In the new size illustrated, the machine can remove rust and scale from any hot rolled bar section, also from structural shapes up to 12-in. width, and plates

o o o

BELOW

A MACHINE designed for the application of factory-coated abrasive belts to the grinding of stainless steel and other alloy sheets has been introduced by the Mattison Machine Works, Rockford, Ill. Machines are built for processing sheets up to 36 to 48 in. wide and 10, 12 and 14 ft. long. Contact rolls are removable and rolls of any degree of cushion may be easily substituted according to the nature of the work. Abrasive belt is automatically controlled and oscillated on the rolls.





ABOVE

TO facilitate loading of this Excelsior automatic, twin spindle, electric iron sole plate grinding and polishing machine, the operator is seated on a movable stool between the two reciprocating fixture boards.

up to 24-in. width, any thickness and in lengths of 25 ft. and under. In the same tumbling operation the material is covered with a rust resisting coating of oil base which can be used for a shop or prime coat. The machine is said to be capable of cleaning and coating 10,000 to 20,000 lineal ft. of lighter hot rolled bar sections in less than an hour. Where painting of light sections is required, aluminum, red oxide, or black graphite paint can be substituted for the regular coating. The actual performance of removing rust and loose scales and painting 14,000 lineal ft. of 1 x 3/16-in. flats with black graphite paint was 55 min. It is estimated that to wire brush this work and paint by hand would require about 60 man-hours.

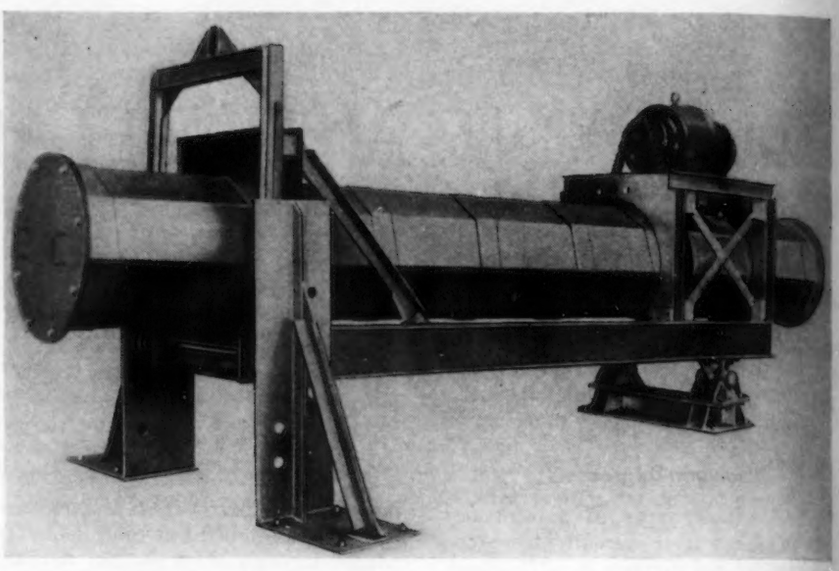
Automatic Cleaning, Finishing and Baking Unit

METAL garment hangers are carried through the complete cycle of cleaning, application of finish, baking and cooling on a conveyorized unit recently built by *Herrington & Randall, Inc.*, Detroit, and believed to be the largest of its kind. H-R oven panels are used. These are non-through metal and are said to reduce wall heat conduction losses to a minimum. Premixed gas is used, directly applied, assuring high thermal efficiency. There is compensation of heat from the cooling zone, and ventilation losses are low due to set-up of finish and localization of the volatilizing zone. Special provision has been made to assure uniformity in the application of the coating. Operations may be stopped with the line loaded and resumed later without loss motion. Inspection of all parts of the equipment may be made at any time, even inside the baking oven.

o o o

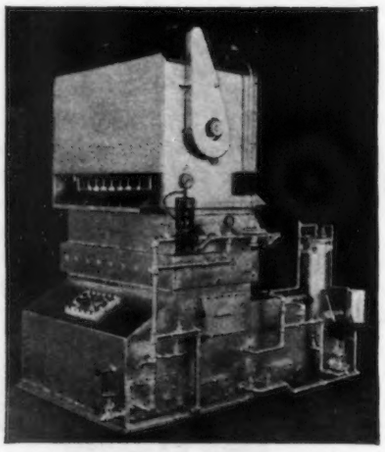
BELOW

DAMAGE in transit has been a source of trouble to sandpaper manufacturers, distributers and users. The edges are frequently crushed by dropping the roll off the freight car or truck. To avoid such damage, Behr-Manning Corp., Troy, N. Y., is now shipping all its sandpaper rolls with resilient end pads made by winding up a long width of corrugated board, sprayed with an adhesive, and afterward sawed into disks of suitable thickness. For the heaviest roll, an 1½-in. bulkhead pad will absorb the impact when the roll is dropped on a concrete floor.



ABOVE

LATEST design of Hilbish-McCahan rotary cleaning machine for bars, structural shapes and plates up to 25 ft. long, now made by Sutton Engineering Co.



SPECIAL design of vapor-liquid-vapor Detrex degreaser equipped with concentrator chamber and continuous filter for the cleaning of cylindrical shaped parts on an automatic conveyor. Another special solvent degreaser has also been designed for cleaning cup-shaped work.

o o o

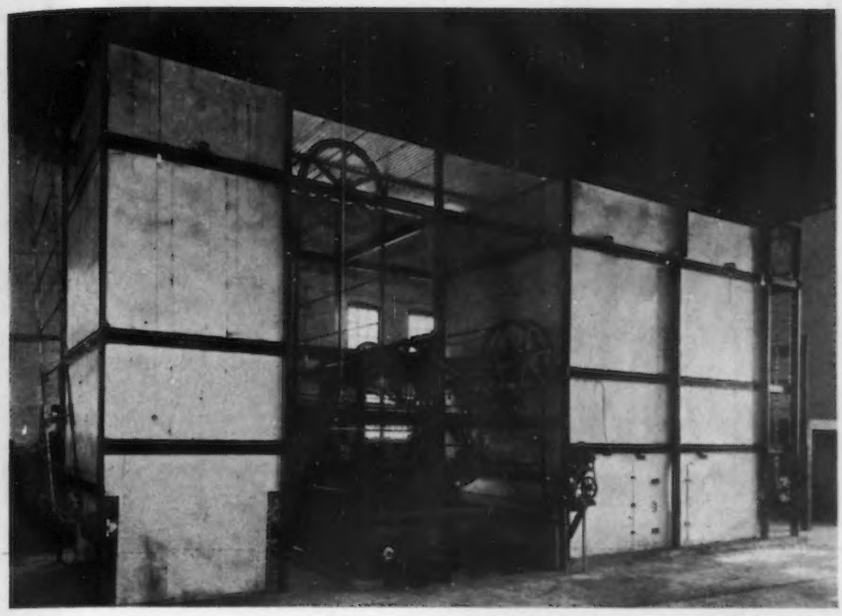
o o o

Economy of operation is stressed by the builder.

Automatic Plating Conveyor

A DISTINCTLY new type of full automatic plating conveyor has been perfected by the *Hanson-Van-Winkle-Munning Co.*, Matawan, N. J. This so-called elevator type conveyor is suitable for all classes of electroplating and coloring operations, including basket cleaning, barrel plating, combination cleaning and burnishing in perforated cylinders, bright dipping, paint dipping and bonderizing. The carriers are of cantilever type and are power lowered and elevated at each station in guides that are attached to horizontal conveyor chains at top and bottom. The elevator unit is counterbalanced. The conveyor is of the dwell type, and at the top position of the elevator, the horizontal chain moves forward one carrier spacing before the elevator is lowered.

The machine is designed to operate by one of three methods: With hydraulic elevators to raise and lower the elevator and motor drive to the chain; with crank and connecting rods for operating the elevator, part of the crank travel being used to move the chain forward one station; and with a gear driven chain and sprocket drive to the elevator and separate but synchronized drive for the conveyor chain. In high speed plating solutions, the racked work may be kept in constant motion by oscillating back and



ABOVE

THIS large size unit for cleaning and applying and baking the finish on metal garment hangers has an overall length of 44 ft., height of 20 ft. and width of 15 ft. At the unloading end at the right, a second unloading point is provided for balcony storage if desired. Installation by Herrington & Randall, Inc., Detroit.

o o o

forth, permitting use of high current densities.

pH Recording and Controlling Instruments

A NEW line of recorders and controllers of the pH value of solutions has been announced by the *Bristol Co.*, Waterbury, Conn. These instruments employ the glass electrode method of measurement of hydrogen-ion concentration as an index of the acidity of the solution. The scale covers the neutral range of 3 to 10 pH such as found in electroplating solutions (7 is the pH of pure water). Two types of electrode assemblies are offered: The inclosed flow type in which the solution under measurement is pumped or allowed to flow through the chamber; and a direct immersion type for use in tanks and vats. They can be used in viscous or even semi-solid substances and in rapidly circulating liquids. The instrument is offered in a wide strip chart model and a round chart model. Automatic controllers are offered in both electric and air operated models.

Papers for Filtering Presses

ONE of the difficulties encountered in filtering operations, especially in recovering electroplating solutions, is the clogging up of the canvas filter cloths with solid matter. To overcome this condition, *Hanson-Van Winkle-Munning Co.* is offering a filter press paper which is placed against the cloth when assembling the press. The paper catches all the suspended matter and is thrown away when loaded with sludge. The paper is said to have nearly as high a wet breaking strength as the dry breaking strength. It is furnished in reams of 500 sheets in 12½-in. squares to fit a 12 x 12-in. Sperry press. Two holes are cut in opposite corners to line up with the holes in the plates and frames.

Electrocleaning Compound

ELECTREX is a new compound offered by the *Magnus Chemical Co.*, Garwood, N. J., for facilitating

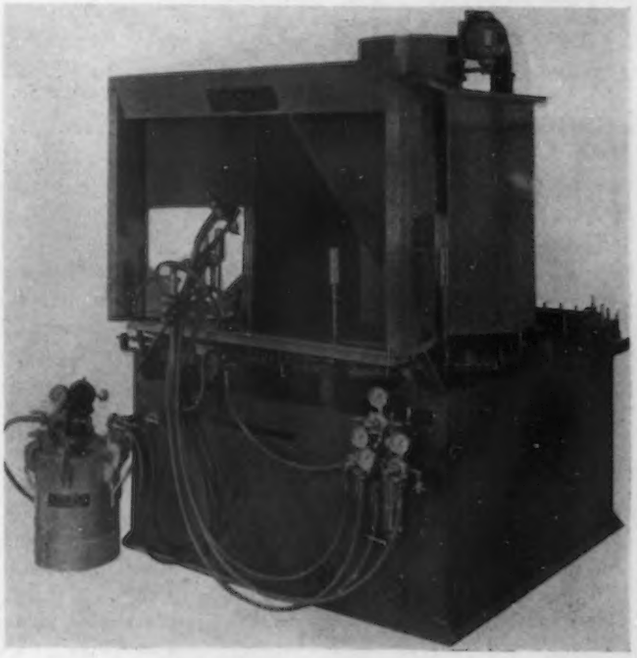
AT LEFT

PAINTING of lathes at the Monarch Machine Tool Co. plant is now done over a 7 x 12 ft. grating in the assembly floor within a few feet of other operations. The fume laden air is exhausted through the grating at a speed of 200 ft. per min. and is discharged into a welded tank directly below where a continuous cascade of chemically treated water segregates the solids in the paint fumes. This action precipitates a sponge-rubber-like substance that is non-inflammable. With downward air suction, the operator is never in a position where he can inhale the fumes. The air, which is exhausted through an underground tunnel at the rate of 22,400 cu. ft. per min. is first passed through eliminator packs to remove all solution from the air for reuse.

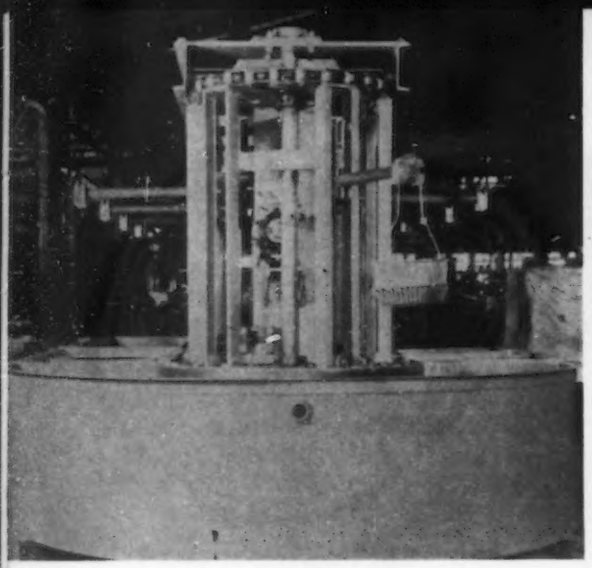
o o o

AT RIGHT

STANDARD spindle type automatic spraying machine, recently introduced by the Binks Mfg. Co., 3114 Carroll Avenue Chicago. It is readily adaptable to all types of automatic spray finishing for clocks, battery boxes, lamp fixtures and similar items. The machine utilizes the new Binks Thor model No. 21 automatic spray gun connected with a three-way valve that allows the gun to spray only when it is following the revolving products. The unit can be furnished with either a dry or water wash type spray booth.



o o o



ABOVE

END view of a bright dip conveyor, one of the new elevator type full automatic plating machines recently developed by Hanson-VanWinkle-Munning Co. Basket is being transferred and is about to be lowered.

o o o

the electrocleaning of metals, particularly before bright plating. The material is offered in a graded series of cleaners, based on the Magnus wetting agent Saponex, which has low surface tension and hence rapid wetting, penetrating and dispersive properties. Electrex is acid and hard water proof, and does not form troublesome scum. With the bath kept near the boiling point and a current density of 40 amp. per sq. ft., cleaning time varies from ½ to 3 min., depending upon the foreign matter present. Where the work is heavily loaded with drawing or polishing compounds, two-tank cleaning is generally used, preliminary immersion being made in a hot solution of reduced strength. The work should be the anode, except when cleaning soft metals like die cast zinc and aluminum.

Coating Compound for Plating Equipment

IN addition to the synthetic resin tape for insulating plating racks, illustrated, another material has been announced for insulation of plating equipment and chemical apparatus. Called Impervium, it is a synthetic rubber-like compound that is applied to the parts to be protected. Thus far it is not available in commercial quantities, but the maker will treat test samples at cost. It is said to maintain flexibility and elasticity over a long period of time, and is resistant to acids, alkalis and oils. A nickel plating unit carrying a 0.005 in. coating of Impervium showed no effect on the insulation after 30 days' service, including five days in an electric cleaner. No effect was shown on the Impervium lining of a container filled with oil at 150 to 175 deg. F. The coating has a dielectric strength of 1000 volts per mil, and tests indicate extremely low leakage through the coating. The material will char, but will not burn. It is made by *Paramount Rubber Service, Inc.*, 1430 Rosedale Court, Detroit.

o o o

Aluminum Paint

FOLLOWING extensive tests, the American Asphalt Paint Co., 43 E. Ohio Street, Chicago, has successfully combined a 99.5 per cent Gilsonite asphalt and special Valdura processed tung oil base with a fine aluminum paste and produced a ready-mixed aluminum paint that requires no special mixing, but can be applied directly as it comes in the container. Both accelerated as well as outdoor weather tests prove that Valdura's ready-mixed formula is equally as durable as regular Valdura asphalt aluminum paint. The production of a practical ready-mixed aluminum paint automatically overcomes the inconvenience of mixing enough paste and vehicle for only a day's painting.

Synthetic Enamels

A NEW line of high speed synthetic enamels, especially suitable for use on metal products subjected to severe service, such as washing machines and refrigerators has been de-

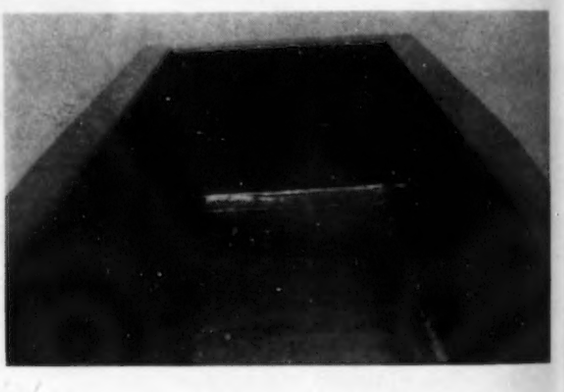
AT LEFT

NEW Mounting for the line of Pneumix air motored agitators, made by Eclipse Air Brush Co., 390 Park Avenue, Newark, N. J. The laterally swinging cross arm holding the air motor with direct drive shaft and propeller is adjustable vertically, ease of movement up or down being featured. The large size is a 5-ft. model for production work, the smaller unit for the laboratory. The company has also developed a new clamp type air motored mixer for use on 5-gal. batches, equipped with a ⅜-in. chromium plated or stainless steel shaft 12 in. long.

o o o

BELOW

TYGON is a new synthetic tank lining material suitable for handling any plating or pickling solution. It is said not even to be affected by the strong oxidizing agents such as concentrated nitric, sulphuric, or chromic acids, aqua regia, and so forth. Tanks lined with TYGON have the added advantage of being able to handle first one solution and then another, making it unnecessary to compromise pickling or plating solutions to those that the tanks will handle. The compound is generally applied to steel, although it may be applied to concrete or wood tanks. This is a product of the United States Stoneware Co., Akron, Ohio.



BELOW

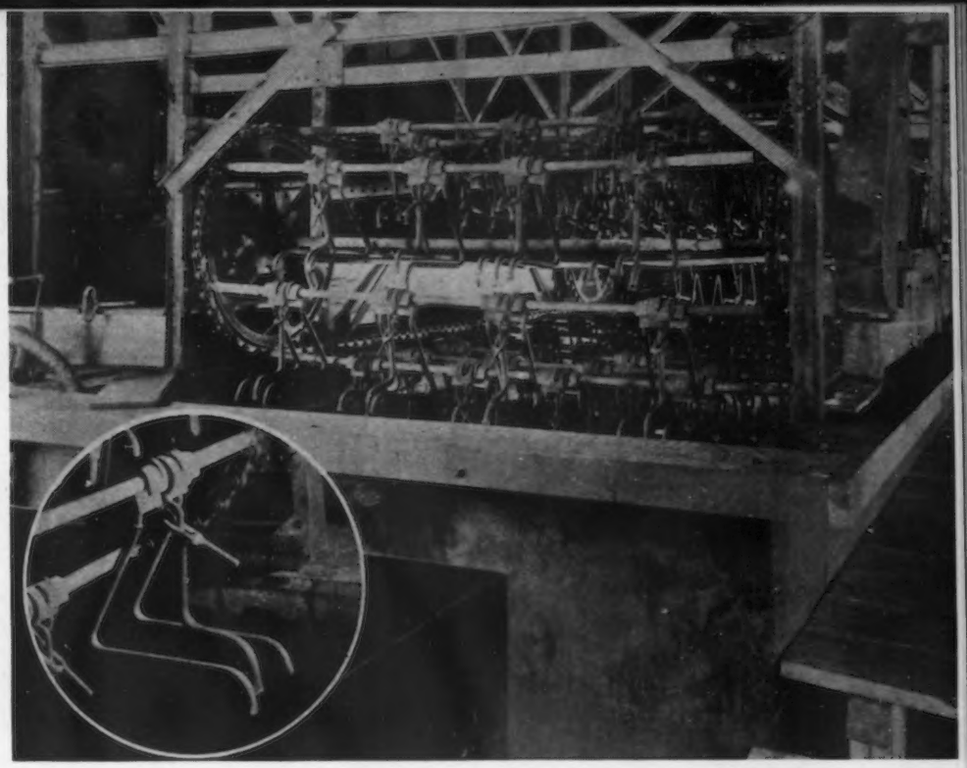
THE Binks Thor No. 16 spray gun is a new design for lighter work. Among the claims made for the gun are: better atomization and better control, interchangeable nozzle, less pressure drop and less air consumption. Control for the amount of material is at the back of the unit, while control of width of spray is by a knurled screw just back of the head.

veloped by *Maas & Waldstein Co.*, Newark, N. J. These Codur enamels cut down the time needed for finishing. They dry out of dust rapidly and bake in 15 min. at 325 deg. F. to a fine finish said to be exceedingly durable and resistant to marring, moisture, and the action of ordinary household chemicals. Codur enamels are furnished in all plain colors and also in colors with metallic lusters. They can be used in one spray coat or over a primer.

With another new *Maas & Waldstein* baking enamel, known as Baking Platelustre, any polished metal can be made to resemble brass, chemically treated aluminum and steel, and other colored metals, according to the manufacturer. When baked, the finish will resist the action of cleaning operations and also nickel, chromium and other plating baths so that, when applied sectionally, a wide variety of effects is made possible. Flat stock finished with this enamel can be formed after baking. Baking Platelustre can be applied to any kind of polished metal by spraying or roller coating.

FRANZITE, new fast air-drying synthetic enamel, recently released by *Hilo Varnish Corp.*, 42 Stewart Avenue, Brooklyn, was specially formulated to give good hiding and high gloss in one coat, and dry hard overnight. It sets in 20 min. and dries to touch in 45 min. May be force dried by 20 min. bake at 150 deg. F. Franzite is elastic and has good adhesion in wood, steel and similar surfaces. Comes in colors, also black, white and clear.

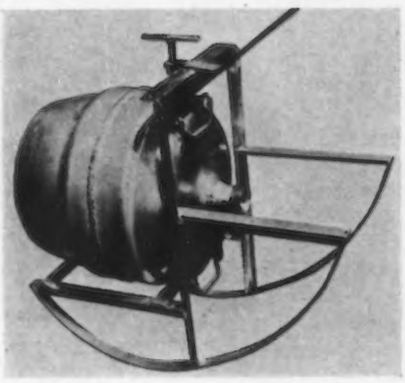
Hilo has also announced Vitra-Carlite clear. Tests show that one dip, baked at 250 deg. F. for 1 hr. produces a beautiful finish with practically no discoloration of the metal. The maker recommends it for all kinds of dip work, enameled metal and wood, and on bright metal parts subjected to considerable heat inside or out.



ABOVE

ONE of the most important applications for Koroseal, the synthetic rubber-like material developed by the B. F. Goodrich Co., is as a lining for tanks used in pickling stainless steel. The unit shown is used for pickling stainless steel beer barrels. It consists of a welded steel tank with a Koroseal lining protected against physical and thermal damage by a carbon brick sheathing. The solution handled is a mixture of 1 to 2 per cent hydrofluoric and 15 to 20 per cent nitric acids at a temperature of 165 deg. F. In the form of tubing, Koroseal is also placed over the conveyor hooks.

o o o



AT LEFT, ABOVE

LIGHT weight safety carboy pourer developed by the Lewis-Shepard Sales Corp., Watertown, Mass., in cooperation with the Aluminum Corp. of America. With the carboy resting on its base, the pourer is placed over the top and clamped by means of a threaded handle. An easy pull then brings the carboy over into pouring position on a rocker base.

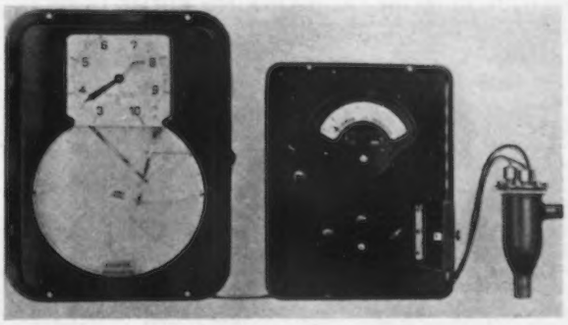
o o o

o o o

AT RIGHT

BRISTOL announces a new line of pH recording and controlling instruments for use in stabilizing the acidity of plating solutions and the like.

o o o



AT LEFT

WRAP RAX is a new synthetic thermoplastic resin in tape form for use in insulating plating racks. It resists chemically all cleaning, pickling and plating solutions commonly used in electroplating. It has excellent dielectric properties and will withstand abrasion and mechanical and thermal shocks. Supplied in 1-lb. rolls of ¾-in. tape, the material is wound spirally over the parts to be protected and then baked in an air oven at 250 deg. F. for 20 min., forming a homogeneous coating. The basic material is supplied by the Bakelite Corp. and the tape is sold through Hanson-VanWinkle-Munning Co., Matawan, N. J.

Wrinkle Finish

A PATENT has recently been granted *New Wrinkle, Inc.*, Dayton, Ohio, on a new method of formulation of its wrinkle finishes.

(CONCLUDED ON PAGE 96)

THIS WEEK ON THE ASSEMBLY LINE

° ° °

By W. F. SHERMAN
Detroit Editor

° ° °

. . . Five to 10 per cent price cut to be general in auto industry for 1940 . . . Optimism expressed for fall outlook as new models are previewed . . . Packard joined by Dodge, Nash and Hudson in resumption of production . . . Assemblies at 24,875; may reach bottom this week.

DETROIT—The automobile industry finds itself currently viewing the newest models and mentally recapitulating its position with an eye to determining prospects for the next year.

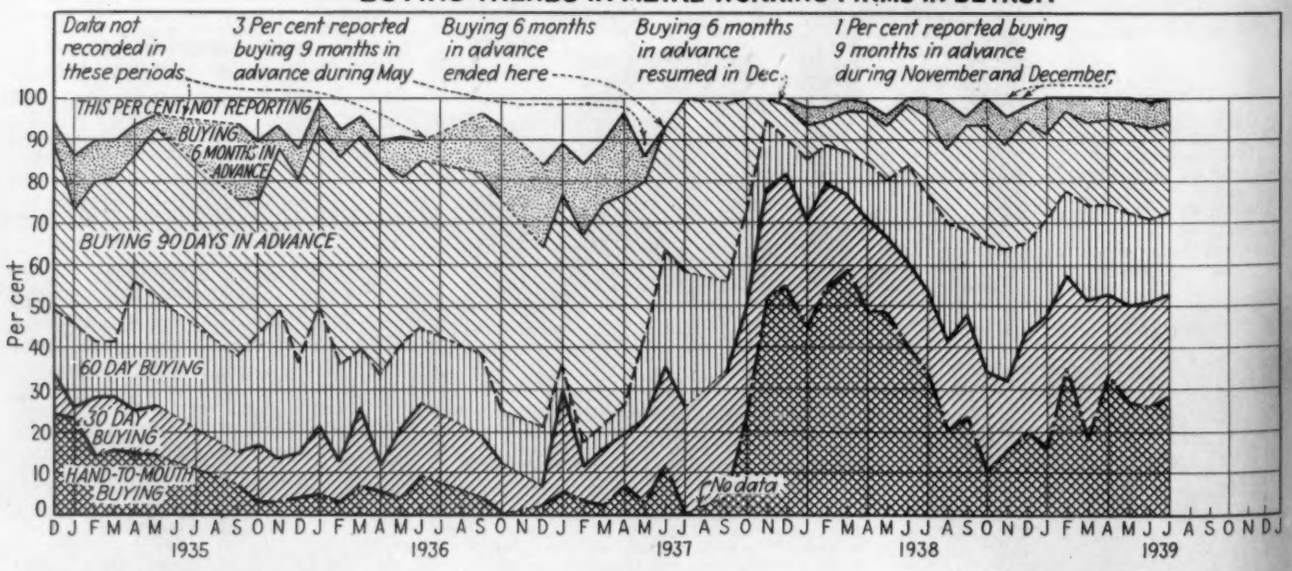
After a somewhat harried week of press previews (the earliest on the record books) we find ourselves anticipating that the months to come will be full ones for the industry, with better-than-usual acceptance of the new cars. Improved designs, some important sales features, low inventories of old models and used cars, all will be contributing factors. Added to those items, there will be a general lowering of prices by about 5 to 10 per cent, according to indications already given.

In a frame of mind engendered by these circumstances, we revert to a prediction made last winter (Jan. 5, 1939, page 74) when we said "thus we should set the probable 1939 model output at close to 3,500,000—optimistic anticipation is 4,000,000 or better." Substantially, that has been borne out; despite the fact that the 1939 model year has been brought to a close (as far as production of that vintage is concerned) about a month early—output since last Oct. 1 totals 3,317,140 and last September's output of 80,000 cars was almost entirely 1939 models. Only the extremely early changeover to the 1940 models prevented easy attainment of the full 3,500,000.

The possibility that this calendar year might develop into a 4,000,000-car year has been suggested. The report of the Automobile Manufacturers Association out last week shows a total of 2,265,708 cars and trucks assembled in the United States and Canada during the first seven months of this year. The question remains whether the remaining five months will be good enough to bring the total within gunshot of the 4,000,000 mark.

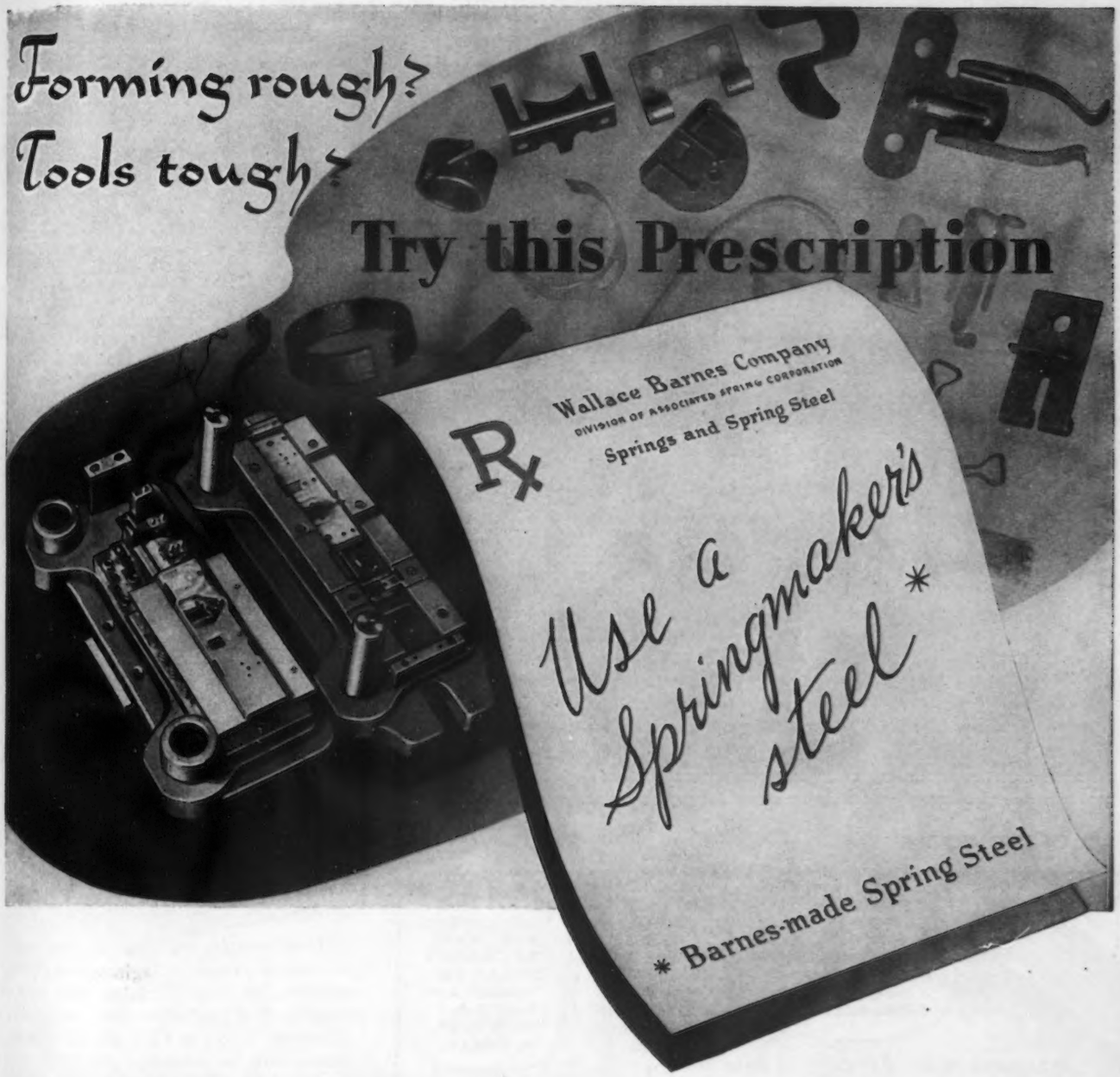
It would take a million and a half new cars in the last quarter, added to the normal output of August and September, to approach the goal. Only boom conditions would make that possible, and in comparison it might be said that the good business conditions which the industry enjoyed last fall nurtured only 1,012,651 new cars. It seems more likely that the final score

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT


Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
1 Per cent reported buying 9 months in advance during November and December
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
70
60
50
40
30
20
10
0
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J
1935
1936
1937
1938
1939

Prepared by THE IRON AGE from data supplied by PURCHASING AGENTS ASSOCIATION OF DETROIT

These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessary and auto plants



Ample warehouse stocks insure prompt deliveries . . . Write the Steel Sales Department for a list of sizes . . . or a quotation.

Barnes-made Spring Steel gets the toughest test of all right in our own plant. We not only make it—we use it! Finicky attention is paid to accuracy to size, forming, hardening and fatigue properties. Ours is *not* a tonnage mill, spring steel is the only product. If you believe, as we do, that good material is the best kind of economy, let Barnes-made Spring Steel be your next order.

WALLACE BARNES COMPANY

Division of Associated Spring Corporation

BRISTOL, CONNECTICUT

SPRINGS · SPRING WASHERS · WIRE FORMS · STAMPINGS · SPRING STEEL

FIRST view of Hudson's new entry in the lowest price field, soon to be publicly announced, the new 1940 Six, in which new features, new fabrics and a new style of upholstery are offered in addition to engineering advances in performance, front end spring suspension, riding comfort and roadability said to be new in this price range. This is one of three new Hudson cars to be presented.

will be about 3,600,000—that is a recent guess by one of the industry's most successful prognosticators.

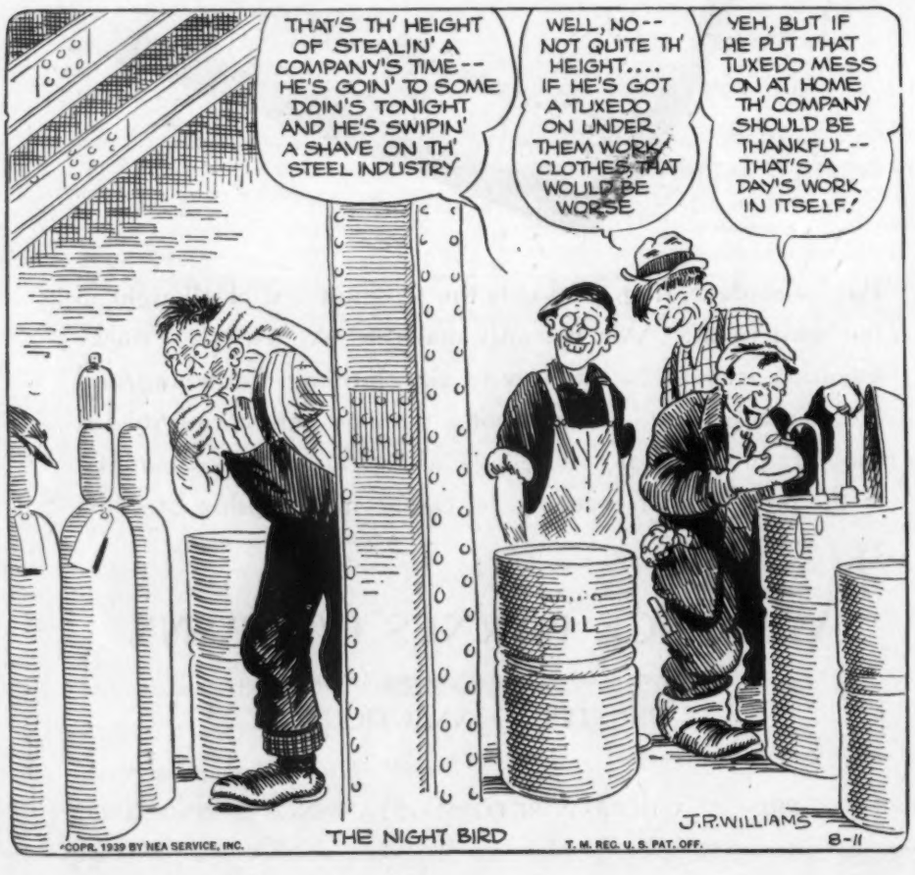
Ward's Automotive Reports places the total of last week's production at 24,875 units for the United States and Canada, a decrease from the previous week's 28,250, but about twice as great as the 13,790 for the corresponding week of last year. Obvious delays experienced in some quarters will keep the current week near the low point, but following more general resumption of production, there will be a rise. Packard, Dodge, Nash and Hudson are already in production.

Last week, without any tapering-off gesture, Ford finished 1939 model production, assembling 17,000 cars in the final work period, compared with 17,500 for the previous week. Chevrolet and Plymouth are still closed down, and there is some indication that the Big Three may get an even start this year. Ford, for instance, will get the Rouge steel plant operating 100 per cent on Aug. 21, the identical date set for resumption of full speed operations in some of the Chevrolet units. Plymouth may get a slightly earlier start, but the difference promises to be negligible.

The approximate status of Chevrolet plans for 1940 is revealed in an announcement that the Chevrolet foundry, largest General Motors unit in Saginaw, and bellwether of industry in the Saginaw Valley, opened just one week ago. Corerooms were manned by full crews and the entire plant, with a working force of 4000, went to work on Monday of this week on three shifts.

The Chevrolet transmission plant will be in full operation, with about 1500 workers, on Aug. 21, as already mentioned. Not long after that, the main Chevrolet forces at Flint and in branch plants will be mustered for 1940 assembly operations. Already the steering gear division at Saginaw and the GM malleable iron division have begun operations for the new year.

THE BULL OF THE WOODS — BY J. R. WILLIAMS


THAT'S TH' HEIGHT OF STEALIN' A COMPANY'S TIME-- HE'S GOIN' TO SOME DOIN'S TONIGHT AND HE'S SWIPIN' A SHAVE ON TH' STEEL INDUSTRY
WELL, NO-- NOT QUITE TH' HEIGHT.... IF HE'S GOT A TUXEDO ON UNDER THEM WORK CLOTHES, THAT WOULD BE WORSE
YEH, BUT IF HE PUT THAT TUXEDO MESS ON AT HOME TH' COMPANY SHOULD BE THANKFUL-- THAT'S A DAY'S WORK IN ITSELF!
OIL
J.R.WILLIAMS
8-11
COPR. 1939 BY NEA SERVICE, INC.
THE NIGHT BIRD
T. M. REG. U. S. PAT. OFF.

Four New Lines Previewed

A galaxy of new cars crossed the field of vision last week when Packard, Hudson, Nash and Willys, in that order, displayed 1940 models at press previews. Pontiac, scheduled between Packard and Hudson, postponed its showing until later in the month, the obvious reason being delays incident to the tool and die strike.

No big 12-cylinder cars were in evidence in the Packard display at the proving grounds at Utica, Mich. It was admitted that this car had been dropped from regular production, but it was said that it probably would be

(CONTINUED ON PAGE 81)

Go through this book on a journey that can well put money in your pocket. Absorb a fascinating story of the work Cuno *continuously cleanable* filters are doing in your industry. See how *many ways* there are of saving time and money—by straining with Cuno. It's not a long journey, but the scenery is fine, and the fare is free if you'll use the coupon below.

MACHINE shutdowns and production stops for cleaning are eliminated with Cuno *continuously cleanable* Auto-Klean filters. Their unique principle of edge filtration allows instantaneous cleaning at any time in any operation — *or all the time.*

Without duplex installations you get *continuous* protection.

Air, gases, all fluids that can be pumped are handled more economically. Other types of Cuno filters, also continuously cleanable, are especially designed to remove damaging abrasive solids and extremely fine particles (as small as .001"). And they are made to your own private requirements. Name your conditions.

Cuno Engineering Corporation
368 South Vine Street
Meriden, Connecticut
Please send me, free, "80 Ways to Make More Money."

Name.....

Company.....City.....State.....

Street.....

avoid stop and go with **CUNO** *Filters*

CUNO ENGINEERING CORPORATION ★ MERIDEN, CONNECTICUT

THIS WEEK IN WASHINGTON

. . . "Most penetrating" steel study ever made expected to reach TNEC by Oct. 15—Government spending to stimulate business to continue well into 1940 . . . Secretary Hopkins appoints six "spark plug" boys as Commerce Department aides.

o o o

By L. W. MOFFETT
The Iron Age

o o o

WASHINGTON—The economic unit of the Department of Justice on or about Oct. 15 will present at hearings before the Temporary National Economic Committee what is said to be the most penetrating study ever made of the steel industry.

Covering the industry from iron ore to finished steel, the presentation, it was stated at the department, will cover such matters as concentration of capacity, production, pricing methods, distribution, profits, employment, problems relating to integration, investment and fabrication in transit.

Underlying the investigation, it was said, are two general kinds of problems: General public interest in the organization and function of the industry; and numerous technical questions primarily of interest to the industry such as price relationships between various kinds of products. Involved in the study will be analyses of competitive problems arising out of the location of plants, the basing point system, the effect of the elimination of the Pittsburgh differentials and technological developments and their bearing on efficiency, employment, prices and distribution.

Western Mills "Held Back"

It was declared that until the department has completed its study and the steel industry has presented its case no final conclusions will be reached. The statement grew out of reports that proposals for a big shake-up in the industry are already under consideration. These reports were emphasized by remarks made by Senator Joseph C. O'Mahoney, Democrat of Wyoming and chairman of the TNEC. He said the steel investigation would be a far-reaching and intensive study as a whole from the standpoint of concentration and added:

"We know, for example, that there are opportunities for development of steel in the West that are being held back by concentration in the East. We will look into that for one thing."

Is "Demobilization" Planned?

The Senator's statement had given the impression that already the proposal was in mind to compel "demobilization" of the industry, breaking it into smaller units and locating plants in the West. Such a far-reaching as well as highly impractical and unenforceable conclusion, it was stated, definitely has not been reached. From quarters outside the Government it was pointed out that, despite his assured tone, Senator O'Mahoney merely reflected a common view among those uninformed on the steel industry. The vast geographical spread of the industry, it was explained, has been contemporaneous with demand so that it covers a nation-wide area, except for the far Western inter-mountain states and even in this section there is blast furnace and steel capacity. In this section as in other sections, it was declared, capacity will grow as the country develops with ensuing demands. While the matter of freight rates as it applies to the section is a controversial issue, it is doubted that they will be as exhaustively dealt with as the TNEC chairman indicated.

FTC Wants Mill Pricing

The basing point naturally will fit into the study but may prove to be only a collateral question to be treated, it was said, under modern conditions which, by reason of the growing number of basing points and elimination of Pittsburgh differentials, has become of less significance than heretofore. However, the Federal Trade Commission, which is a joint agency with the Department of Justice in conducting the steel inquiry at TNEC hearings, bitterly attacked the system and reiterated its recommendation for f.o.b. mill pricing, a system sharply opposed by the industry. Hence, because of the FTC position the controversy over the basing point system probably will be an important matter at the hearings.

Included in the Justice Department study will be a large volume of data on prices and distribution gathered from the industry through two questionnaires, reports on which now have been completed. Among other material is that gathered from steel company files, but it has been stated that there has been no undue use of the subpoena powers in gathering information. It is reported that requests for views on the anti-trust laws, labor relations and such subjects have been voluntarily offered by some companies rather than having been arbitrarily demanded.

The Department of Justice expects that it will require about two weeks to present its steel inquiry before the TNEC. Steel executives will be called to testify for the purpose of developing subjects treated in the exhaustive data the department will submit. Later on at some date not yet determined the industry will be given an opportunity to present its case.

NLRB Orders Tool Makers Reinstated

WASHINGTON — Bussmann Mfg. Co., and McGraw Electric Co., St. Louis, have been ordered by the National Labor Relations Board to discontinue the alleged practice of discouraging membership in the AFL's International Association of Machinists, to bargain collectively with the union upon request and to reinstate with back pay two tool and die makers who, the board alleged, had been discharged for union activities.

The board also has called a collective bargaining election to permit pattern makers and apprentices employed by Sun Shipbuilding & Dry Dock Co., Chester, Pa., to choose between the AFL's pattern makers union and the Sun Ship Employees' Association, Inc.

"Nth DEGREE ACCURACY"

... yours with

SUNOCO

EMULSIFYING

CUTTING OIL

Courtesy of

CINCINNATI GRINDERS INC.

OPERATION: Finish Grind Lynite Pistons
MACHINE: No. 2 Cincinnati Centerless Grinder
WHEEL SPEED: 1236 R. P. M.
WORK REVOLVES: 130 R. P. M.
STOCK REMOVAL: .015 Inch
CUTTING SPEED: 6400 S. F. P. M.
TOLERANCE: Plus or minus .001 inch
COOLANT: 1 part SUNOCO to 60 water

Tolerances to the Nth degree ... finishes that rival mirrors ... faster stock removal ... slower wheel wear —SUNOCO makes them all possible and then some! It cools the work rapidly ... washes away chips ... protects parts from rust.

Test SUNOCO ... learn why leaders say "long live the grinding wheels ... thanks to SUNOCO."

SUN OIL COMPANY · Philadelphia

SUN OILS

PETROLEUM PRODUCTS FOR ALL INDUSTRIES

Government Spending Will Aid Business Well Into 1940

WASHINGTON — Business stimulus in the form of purchases for national defense requirements and construction projects, financed in whole or in part with Federal funds, are expected to continue at fairly uniform rates well into 1940. While the Congressional session just ended turned thumbs down on the proposed $3,060,000,000 spending-lending program and the $800,000,000 plan for broadening the Housing Authority's slum-clearance program, national defense expenditures are looked to by many as an increasingly important factor for stimulating business. Appropriations for national defense purposes during the session amounted to almost $2,000,000,000, or $1,087,000,000 more than last year. For the most part, however, business will be carrying the ball as Federal expenditures begin to taper off.

With the exception of two light cruisers, contracts have been awarded for all of the 23 ships authorized and appropriated for the current fiscal year. These include the two 45,000-tons battleships, eight destroyers, eight submarines, two seaplane tenders and one repair ship.

Where Money Will Go

Out of a total appropriation of $773,049,151 under the Naval Appropriation Act of 1940, earmarked under the naval replacement program, was $207,593,712 for construction and machinery and $46,011,000 for armor, armament and ammunition. Also, the third deficiency bill authorized the department to purchase with money already appropriated for shipbuilding $6,000,000 worth of armor plate facilities to be installed in private plants. Earmarked for naval aviation was $83,798,000.

The Bureau of Engineering got $26,317,500; Construction and Repair, $24,422,500; Ordnance, $31,948,000; Supplies and Accounts, $10,524,000 and Yards and Docks, $8,530,000.

Out of a total of about $971,000,000 appropriated, the War Department will spend $14,250,000 for the placing of educational orders during the present fiscal year and the Procurement Division will buy $10,000,000 worth of critical and strategic materials under the direction of the War and Navy Departments. The War Department is drawing heavily upon a $110,000,000 appropriation for critical items of equipment, including anti-aircraft artillery, semi-automatic rifles, anti-tank guns, tanks, light and heavy artillery, ammunition and gas masks.

Utility Promises Kept

Orders for planes and engines have just been placed by the War Department totaling $100,000,000, completing the major portion of the Army's aircraft purchases. Department officials are reluctant to discuss the agreement negotiated late last fall under which the leading utility companies agreed to expand generating equipment facilities by 1,300,000,000 hp. capacity—a program which involves capital expenditures of $1,000,000,000 a year for the next two years. Utility representatives in Washington, however, say that the companies are complying with their part of the bargain in every respect. Since the orders being placed under the program are the result of private arrangements between the utilities and manufacturers of electrical equipment, the War Department has no information which it cares to divulge.

As of Aug. 9, the PWA estimated that its 1938 program was 47 per cent completed with 3328 projects still under construction out of a total of 6162. From Jan. 1 to Aug. 5 the PWA paid out $310,740,000 in grants and $20,950,000 in loans under the 1938 program, or a total of $331,690,000.

The agency has no information compiled to indicate the amount of PWA money yet to be expended on jobs that have not come out for bids but records show that, although the bulk of the 1938 program is under contract, the $331,690,000 figure represents only about half of the $673,000,000 total of allotments authorized under the program.

Business To Get Breakdown

Federal Works Administrator Carmody, who now is PWA boss under the Roosevelt reorganizing program, plans a series of conferences with builders and manufacturers of building materials and hopes to be able to furnish detailed estimates showing prospective work broken down by materials, months and states to acquaint industry with the Government's requirements for steel, cement, and lumber in the months ahead. This is expected to include requirements under projects being built by PWA, USHA, Public Roads, Public Buildings and WPA agencies now under Carmody's jurisdiction.

By the first of the year or shortly thereafter the PWA program is expected to be 70 per cent completed and by June 30, 1940, virtually 100 per cent completed.

Hopkins Appoints Six "Spark-Plug Boys"

WASHINGTON — Secretary of Commerce Hopkins took steps last week to set up his own brain trust by naming six experts whose activities may be directed toward reviving President Roosevelt's unsuccessful spending-lending proposal and establishing a bureau of industrial economics within the Commerce Department.

Identified as "the spark-plug boys" because Mr. Hopkins told a Senate committee when he asked for funds to hire the "experts" that his department needed "sparking," the new appointees include: Richard V. Gilbert, public finance authority at Harvard University; Robert L. Davison of the Pierce Foundation, Carroll Wilson of Scudder, Stevens & Clark, investment firm; James Hughes, former NRA construction expert; V. L. Bassie, formerly with the Federal Reserve Board; and Paul T. Truitt, Treasury Department expert.

Also named last week to a Commerce Department post vacant since February was James W. Young, advertising and publishing executive, appointed by President Roosevelt to be director of the Bureau of Foreign and Domestic Commerce, succeeding Alexander V. Dye, now commercial attache to London. Formerly professor of business history and advertising at the University of Chicago, Mr. Young is the chairman of the board of the Lane Publishing Co., San Francisco.

The Secretary's new staff of trouble-shooters will investigate construction problems, particularly low-cost housing and private house-building; public utilities; public finance; industry problems; extension of Latin-American trade; wartime industrial mobilization; state trade barriers; and matters affecting all business, involving present conditions and steps necessary to bring about improvement.

DEPENDABILITY
PHILO
BRAND
QUALITY • SERVICE
Ohio Ferro-Alloys Corporation
Canton, Ohio

War Resources Board of Six Civilians Set Up at Washington

WASHINGTON — Headed by Edward R. Stettinius, Jr., chairman of the United States Steel Corp., a War Resources Board was set up last week. Made up of civilians, the board will act in an advisory capacity for the Army and Navy Munitions Board. It will give advice on policies pertaining to the mobilization of the economic resources of the country in the event of a war emergency and in reviewing and perfecting the plans already under preparation by the Munitions Board.

Others named on the War Resources Board were Karl T. Compton, president, Massachusetts Institute of Technology; Walter S. Gifford, president, American Telegraph & Telephone Co.; Harold G. Moulton, president, the Brookings Institution; John Lee Pratt. director, General Motors Corp.; and Gen. Robert E. Wood, chairman, Sears, Roebuck & Co. Other members will be appointed at a later date. Col. Harry K. Rutherford, United States Army, was designated as secretary to the board.

It was pointed out by Assistant Secretary of War Louis Johnson and Assistant Secretary of the Navy Charles Edison, joint chairmen of the Munitions Board, that, while it is an agency of long standing, it has recently been made responsible directly to the President instead of to the secretaries of War and Navy as formerly. It was added, however, that in an emergency the War Resources Board would become an executive agency of the government with broad powers similar to those of the old War Industries Board. In this event the board would report directly to the President as a War Resources Administration.

The first activities of the new committee, it was announced, would be to consult with the chairman of the former War Industries Board, Bernard Baruch and other "elder statesmen" of the World War period to the end that their advice and counsel would be utilized.

The statement of Assistant Secretary Johnson and Assistant Secretary Edison said:

"The two Secretaries expressed themselves as deeply appreciative of the sacrifice of time and effort entailed on the part of the gentlemen who have accepted membership to the War Resources Board and indicated that they will be called upon to perform a service of the highest importance to the national welfare. The willingness with which this responsibility has been accepted pays high tribute to the quality of the men comprising the new board."

Army Machinery Awards Total $3,471,370

WASHINGTON — Contracts awarded by the War Department's Ordnance Division under the artillery, rehabilitation machinery, and special machinery programs; by the Air Corps, and by the Chemical Warfare Service during the period July 16 to 31 totaled $3,471,370. The Ordnance Department made these awards:

Under the artillery material program—Sperry Gyroscope Co., Brooklyn, sound locators, $1,765,157; Pennsylvania Forge Corp., Philadelphia, $10,800; and the Camden Forge Co., Camden, N. J., $48,287; both contracts for breech rings gun forgings.

Under the rehabilitation machinery program—Kearney & Trecker Corp., Milwaukee, $33,979; Brown & Sharpe Mfg. Co., Providence, R. I., $8,482; Harding Brothers, Inc., Elmira, N. Y., $2,184, all for milling machines; Lloyd & Arms, Inc., Philadelphia, reconditioned lathes, $22,849; A. B. Farquhar Co., Ltd., York, Pa., hydraulic press, $20,610; Ex-Cell-O Corp., Detroit, shell-turning machine, $26,849; Barber-Colman Co., Rockford, Ill., grinder machine, $3,185; Union Twist Co., Athol, Mass., grinder machine, $1,967.

Cincinnati Milling Machine & Cincinnati Grinders, Inc., grinder machines, $4,055 and horizontal milling machines, $18,830; Norton Co., Worcester, Mass., grinder machines, $3,751; Leland-Gifford Co., Worcester, Mass., drilling machine, $1,567; The Fellows Gear Shaper Co., Springfield, Vt., gear shaper, $5,053; Stanley P. Rockwell Co., Hartford, Conn., rotary gas furnaces, $3,870; Niles-Bement-Pond Co., Hartford, Conn., chambering machines, $28,036 and die-sinking machines, $11,385; Sundstrand Machine Tool Co., Rockford, Ill., milling machine, $6,030.

Under the special machinery program—Austin-Hastings Co., Cambridge, Mass., $10,415; and Pratt & Whitney Co., Hartford, Conn., drilling and reaming machine, $14,660.

The Air Corps made the following awards for thread, plug, pipe and snap gages.

The Hanson-Whitney Machine Co., $18,008; John Bath & Co., Inc., Worcester, Mass., $9.279; Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., $62,820; Greenfield Tap & Die Corp., Greenfield, Mass., $1,569; The Van Keuren Co., Watertown, Mass., $2,415.

The Chemical Warfare Service awarded a $3,096 contract to the Pico Mfg. Co., Philadelphia, for jigs; and a $1,152 contract to the Fremont (Ohio) Tool & Die Co., for dies.

The Navy Department's Bureau of Supplies and Accounts has awarded contracts to the following:

E. Behringer Sheet Metal Works, Inc., head shells, $30,375; Reed-Prentice Corp., Worcester, Mass., lathes, $22,580; International Minerals & Metals Corp., New York City, ingot copper, $15,591; Eclipse Aviation Division, Bendix (N. J.) Aviation Corp., aircraft starters, $43,614; The Acme Machine Tool Co., Cincinnati, turret lathe, $7,430; Wallace Supplies Mfg. Co., Chicago, machine, $7,320; Republic Steel Corp., Bolt & Nut Division, Cleveland, bolts, $7,037; Brown & Sharpe Mfg. Co., Providence, R. I., milling machines and equipment, $22,268; and Curtiss-Wright Corp., Buffalo, airplanes and spare parts, $1,121,895.

Brown & Sharpe Mfg. Co., Providence, R. I., milling machine, $14,912 and cylindrical grinders, $6,838; United Aircraft Corp., East Hartford, Conn., propeller assembly, $6,521; United Aircraft Corp., Vought-Sikorsky Aircraft Division, disk brakes, airplanes, $18,480; Kearney & Trecker Corp., Milwaukee, Wis., milling machine, $12,058; Revere Copper & Brass Inc., Baltimore.

Order Placed for 25,000 Sheet Steel Corn Cribs

WASHINGTON — Involving about 25,000 tons of 24 to 20-gage galvanized sheets, the Department of Agriculture Commodity Credit Corp., on Wednesday of last week awarded contracts aggregating $3,611,520 to six manufacturers for 25,000 cribs having a total capacity of 43,279,000 bu. of shelled corn. The cribs are to be used to store corn in connection with the ever-normal granary program. The awards, the first of the kind ever made by the Government, provide that delivery of the bins shall begin in about 15 days and be completed within 60 days. The cost of the bins, which range from 1000 to 2000 bu. in size, will average about 9½c. per bushel of bin capacity, laid down at country points.

Shipment of the bins is to be made direct from factory to country agricultural conservation associations in the commercial corn producing areas, the country associations to have complete charge of the bins in the counties. The successful bidders were: A. N. Eaton Metal Products Co., Omaha; Martin Steel Products Co., Mansfield, Ohio; Columbian Steel Tank Co., Kansas City, Mo.; Butler Mfg. Co., Galesburg, Ill., and Kansas City; Sioux Steel Co., Sioux Falls, S. D., and Edwards Mfg. Co., Cincinnati.

Specifications call for bins constructed of substantial and durable material in such manner as to provide "weather-tight" storage for grain. All bins are to be constructed of galvanized steel having not less than 1¼ oz. of zinc per square foot and a minimum thickness of not less than 20 gage for walls, except 22 gage for bins 14 ft. or less in diameter and 24 gage for all floors and roofs.

It was announced that additional bins will be purchased at a later date if more space is required for the storage of Government-held corn. It is understood that if further awards are made they will call for 10,000 to 15,000 tons of galvanized sheets and that number of bins.

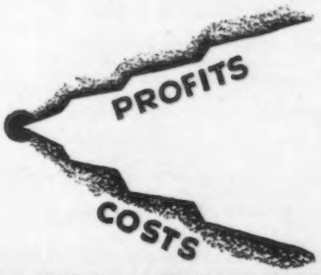
A PROVING GROUND 74′ x 53′

(MONARCH'S BOOTH AT THE CLEVELAND EXHIBIT)

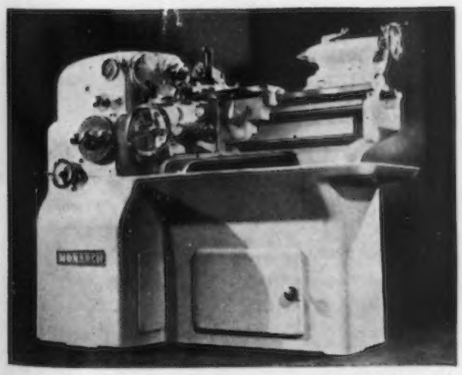
IT WILL BE A GREAT SHOW . . . . BUT DON'T WAIT UNTIL OCTOBER . . . . . GET MONARCH'S COST REDUCING FIGURES NOW!

MONARCH has one ultimate goal . . . continuously to improve its lathes so that each one will produce more and better work with less operator effort . . . so that each will make more money for the user. Monarch's enviable position in the lathe field proves that Monarch has achieved this goal.

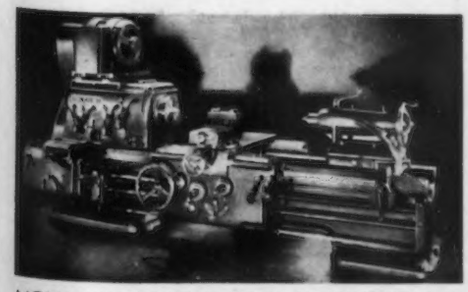
Monarch will not wait to "spring" a new line at the Cleveland show, because the Monarch policy calls for the presentation of new machines, new features, new methods—as they are developed. On its miniature proving ground, at Cleveland, Monarch will show substantially the same machines it is offering now. So don't wait. Every day you do without the Monarchs you will ultimately buy, you lose the extra profits these machines can make for you today.



SOME OF THE PROFIT-MAKING MACHINES MONARCH IS OFFERING



MONARCH 10″ x 20″ SENSITIVE PRECISION LATHE



MONARCH MODEL N N ENGINE LATHE

MONARCH-KELLER CONTROLS

Monarch lathes, equipped with Monarch-Keller Controls, will reproduce contour shapes, inside and outside, to a tolerance of .001″ or closer . . . from a thin master template. They do this in a fraction of the time required by ordinary methods. Production increases up to 500% are commonplace.

MONARCH AUTOMATIC SIZING CONTROLS

Any Monarch lathe equipped with these controls becomes an automatic machine and produces work much faster and more accurately than can be done by any other method. Many of these machines, now in use, are producing from two to five times the work turned out by a manually controlled lathe.

MONARCH *Magna-Matic*

This is regarded as today's most universal automatic lathe. Small lot production can now be put on an automatic basis with greatly lowered unit production cost.

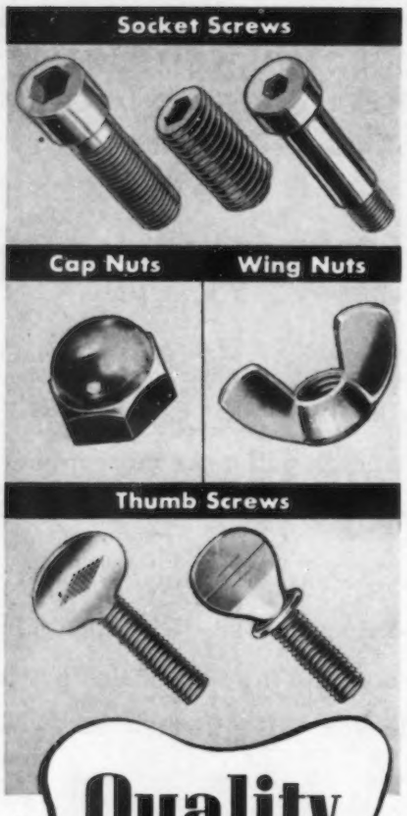
THE MONARCH MACHINE TOOL CO. • Sidney, Ohio, U. S. A.

MONARCH LATHES
COVER THE TURNING FIELD

YOUR SMARTEST INVESTMENT TODAY—MODERN MACHINE TOOLS

MAKE MORE MONEY WITH MONARCHS

AGENCIES IN PRINCIPAL INDUSTRIAL CENTERS THROUGHOUT THE WORLD



Quality

THAT WINS UNQUALIFIED APPROVAL OF ENGINEERS AND PRODUCTION MEN

PRODUCTS of an improved process developed through years of experience in the manufacture of precision screw products, Parker-Kalon *Cold-forged* Socket Screws, Cap Nuts, Wing Nuts and Thumb Screws possess that *strength, uniformity* and *accuracy* that spell Q-U-A-L-I-T-Y. Stocked by reliable industrial distributors near you. Write for free samples . . . compare . . . see for yourself.

PARKER-KALON CORPORATION
200 Varick Street, New York, N. Y.

PARKER-KALON
Cold-forged
SOCKET SCREWS
WING NUTS · CAP NUTS
THUMB SCREWS
SOLD THROUGH REPUTABLE DISTRIBUTORS

Government Orders for Week Ended Aug. 5

WASHINGTON — Government contracts for iron and steel products as reported by the Labor Department's Public Contracts Division for the week ended Aug. 5 totaled $618,755. For non-ferrous metals and alloys contracts amounted to $147,971 and for machinery, $454,745. Details follow:

Iron and Steel Products

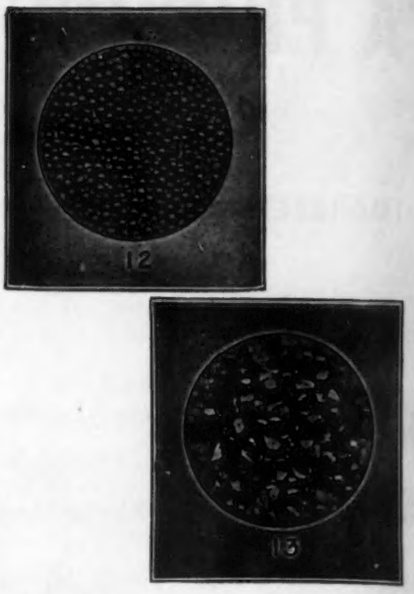
Keystone Steel & Wire Co., Peoria, Ill., War, Engineer, galvanized wire fabric	$54,500.00
Erie Forge Co., Erie, Pa., War, Engineer, forged crankshaft	11,400.00
Hardie Tynes Mfg. Co., Birmingham, Navy S & A, bearings, kingpost	15,312.00
American Steel Band Co., Pittsburgh, TVA, roofing and siding	24,495.00
Thos. Somerville Co., Washington, D. C., Navy S & A, pipe, steel.	73,663.04
Crane Co., Salt Lake City, Utah, Interior, steel pipe	13,349.95
Bethlehem Steel Co., Bethlehem, Pa., Navy S & A, steel, bar	14,040.00
Columbia Steel Co., San Francisco, Interior, billet steel bars	38,602.33
Central Iron & Steel Co., Harrisburg, Pa., Navy S & A, steel plate	88,811.47
Morris, Wheeler & Co., Inc., Philadelphia, Navy S & A, steel, sheet	108,475.64
Jessop Steel Co., Washington, Pa., Norfolk Navy Yard, steel, corrosion-resisting	17,556.18
American Bridge Co., Denver, Interior, structural-steel framing	54,079.00
Lehigh Structural Steel Co., New York, TVA, transmission towers	13,198.00
Ingalls Iron Works Co., Birmingham, TVA, structural steel	17,222.00
Delaware Tool Steel Co., Wilmington, Del., Navy S & A, chisels, pneumatic	12,064.62
Crucible Steel Co. of America, New York, Navy S & A, steel, tool	11,553.81
Heller Brothers Co., Newark, N. J., Navy S & A, files, miscellaneous	19,974.40
Hibbard Spencer Bartlett & Co., Chicago, Interior, hardware and plumbing supplies	10,016.50
M. O'Neil Supply Co., Inc., Brooklyn, N. Y., Navy S & A, fittings, steel	20,441.24

Non-Ferrous Metals and Alloys

The Aluminum Cooking Utensil Co., New Kensington, Pa., Navy S & A, frames, containers, boilers	$24,205.93
Phelps Dodge Copper Products Corp., British American Tube Div., New York City, Navy S & A, pipe, copper	20,941.10
Nehring Electrical Works, DeKalb, Ill., TVA, copper wire	12,026.21
Anaconda Wire & Cable Co., New York, War, Engineer, copper conductor	26,497.91
New Jersey Zinc Sales Co., Inc., New York, Navy S & A, zinc, slab	33,000.00
Wilbur B. Driver Co., Newark, N. J., Navy S & A, nickel	16,800.00
American-LaFrance-Foamite Corp., Elmira, N. Y., Navy S & A, fire extinguishers	14,500.32

Machinery

Gardner-Denver Co., Quincy, Ill., Navy S & A, air compressors	$16,894.00
Gisholt Machine Co., Madison, Wis., Navy S & A, lathes, turret	12,388.00
Hardinge Brothers, Inc., Elmira, N. Y., War, Ordnance, bench lathes	40,929.20
Pratt & Whitney Division Niles-Bement-Pond Co., Hartford, Conn., War, Ordnance, milling machines	22,041.00
Swind Machinery Co., Philadelphia, Navy S & A, table, revolving	17,504.00
The Monarch Machine Tool Co., Sidney, Ohio, Navy S & A, lathes, engine	12,313.84
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn., War, Ordnance, chambering machines	28,036.00



DOLLARS Saved Daily

Since the introduction of our Heat-Treated Steel Shot And Heat-Treated Steel Grit

Consumers are saving

10 per cent
15 per cent
25 per cent

Metal blasting faster.

Metal blasting cheaper.

Metal blasting with a better finish than ever before.

Our large, modern plant produces only heat-treated abrasives—uniform quality the year round.

A month's run of our shot or grit in your machine will prove the above statements.

Send us samples of the sizes you use; test our product in your own machine and save money.

A ton or a carload.

HARRISON ABRASIVE
Corporation
MANCHESTER, NEW HAMPSHIRE

We Never Compromise With Quality

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Navy S & A, machines, milling	$20,972.20
Northwest Engineering Co., Chicago, TVA, diesel powered shovel	16,150.00
Bay City Shovels, Inc., Bay City, Mich., Norfolk Navy Yard, crane, crawler	12,400.00
Northern Pump Co., Minneapolis, Minn., Navy S & A, pumps, fuel oil	16,019.20
Warren Steam Pump Co., Inc., Warren Engineering Corp., Agent, New York City, Navy S & A, pumps, condenser	57,348.00
The Ellis Drier Co., Chicago, Justice, laundry equipment	13,745.00
American Machine & Metals, Inc., New York City, Justice, laundry equipment	13,509.30
St. Joe Machines, Inc., St. Joseph, Mich., Justice, laundry equipment	13,053.00
Smith, Drum & Co., Philadelphia, Justice, laundry equipment	28,150.00
St. Joe Machines, Inc., St. Joseph, Mich., Justice, laundry equipment	13,159.00
American Laundry Machinery Co., Cincinnati, Justice, laundry equipment	10,133.50
The Midvale Co., Nicetown, Philadelphia, Navy S & A, racks; pinions	90,000.00

Aluminum Dust As Silicosis Preventive

WASHINGTON — A warning against the suspension of approved practices of ventilation as a preventive of dust disease, silicosis, has been issued by Secretary of Labor Frances Perkins.

"While experiments recently conducted, using aluminum dust as a preventive or cure of silicosis, are most encouraging, it is imperative that this should in no way interfere with the application of approved engineering methods of dust control," Secretary Perkins said.

Because of recent widespread publicity hailing the use of aluminum dust in experiments by Canadian scientists, she had Dr. E. J. Stieglitz of the Department of Labor staff confer with Canadian authorities.

"The Canadian authorities, while confident that they are on the right track in developing aluminum dust prophylaxis, at the same time warn against undue reliance upon this medium for complete protection of workers," continued the Secretary.

"The report made of Canadian experiments by Dr. Stieglitz contains information of the greatest importance to workers exposed to silicosis and to management having the responsibility for controlling this dust hazard. It is pointed out that there is no intent or even hope that this method will be a substitute for the engineering control measures developed and applied in recent years."

In the experiments carried on in the Department of Medical Research of the University of Toronto it has been found that metallic aluminum dust does

G-E DIESEL-ELECTRICS come as small as 23 tons. This is one of the two 43-ton, 300-hp locomotives operated by the Broward County Port Authority, Port Everglades, Fla. Both can be operated from one cab

PUT YOURSELF IN HIS PLACE FOR A MOMENT

--and We'll Show You

What a BUY These DIESEL-ELECTRICS Really Are

FIRST, just push a button, and the engine starts. Then open the throttle—it's really an electric controller—and you're away. A start as smooth as velvet—that's what electric drive gives you. It enables diesel-electrics to start much heavier loads than other locomotives of equal weight. This smooth acceleration reduces wear on rolling stock. Remember, too, that diesel-electrics exert maximum horsepower from about 3 mph up.

You pick up speed smoothly and rapidly. There are no gears to shift or other operations to distract your attention from the track ahead. Note the clear view both ahead and behind—another reason why diesel-electric operation promotes safety.

A sharp curve, but there's no excess wear on wheels or track as the diesel-electric rounds it. Again, thank electric drive—it makes possible swivel-truck design, with short, rigid wheel base.

Now, about fuel. Fifteen years of diesel-electric operation have shown that fuel costs are but one-third those of conventional steam locomotives. Refueling takes but a few minutes.

Why not have a G-E representative call and discuss with you the advantages of diesel-electric operation for your own haulage jobs? Just write our nearest office. General Electric, Schenectady, N. Y.

See the G-E "House of Magic"
New York World's Fair
San Francisco Exposition

EXPERIENCE
General Electric has built or has equipped with electric drive more than 300 diesel-electric locomotives.

GENERAL ELECTRIC
250-41M

most completely prevent the solution of silica by coating the particles of silica with aluminum. Apparently the lungs of the experimental animals were protected from the progressive injurious effects of the dust. Up to this time no observations have been made on human silicosis sufferers, but such clinical studies are planned. These data, however, it was said, will be insufficient to warrant any conclusions before another three to five years have elapsed.

Some 500,000 workers in the United States are exposed to the danger of the serious silicosis hazard, many in foundries, mines and wherever silica-bearing material is worked or handled in a manner to produce dust. The Department of Labor has made a study of silicosis prevention, and recently issued a booklet on "Dust Control in Foundries."

Westinghouse Workers At Lima To Vote On C.I.O.

WASHINGTON—The National Labor Relations Board has dismissed a petition filed by the AFL's Metal Polishers, Buffers, Platers and Helpers Union which sought certification as the exclusive bargain representative for 10 polishers and buffers employed by the Climax Machinery Co., Indianapolis, Ind.

The NLRB majority said that the CIO's Amalgamated Association of Iron, Steel and Tin Workers Union had a contract with the company which covered all production and maintenance employees, that the AFL union would not be appropriate for collective bargaining purposes, and that in seeking to exclude platers and helpers it was "attempting to establish a unit that constitutes merely a fragment of a traditional craft group."

The board also has called a secret ballot election at Westinghouse Electric & Mfg. Co., Lima, Ohio, to allow workers to vote for the CIO's United Electrical, Radio and Machine Workers Union, for the Lima Westinghouse Employees Association, Inc., or for neither.

McKAY TUBE MILLS
(ACETYLENE WELD)

McKay Tube Mills—built in a complete size range—all possess certain characteristic design features which have proven of definite value under actual production conditions. We list a few of the outstanding features:

SINGLE UNIT CONSTRUCTION: Forming Units—Welder—Flash Trimmer—Sizing and Straightening Units and Cutoff are mounted on a one piece welded bed plate, heavily reinforced—with the accurate alignment shoulders required—permanently machined onto the top surface. This makes the machine an entirely self-contained unit, with none of the field alignment problems which occur where separate units are used.

FLOOR SPACE REQUIREMENTS: Single unit construction cuts floor space requirements in half. Machine illustrated will make up to ⅝" tube—space required 15'0" by 4'0". A machine to make up to 1½" tube requires only 21'0" by 5'8".

McKAY FORMING ROLL DESIGN: Maintains accurate seam alignment, necessary for good seam weld. It also produces a smooth tube, with size maintained closer than commercial tolerance requirements.

CENTRALIZED CONTROLS: Heat, speed and pressure controls placed for maximum convenience of operator.

QUICK CHANGE-OVER: Actual production conditions prove that a complete change-over from one size tube to another can be made in less than three hours by regular operator and helper. This is because McKay construction includes enough auxiliary equipment so that units may be interchanged without disturbing vital settings.

McKAY "McKROMETER" ROLL PRESSURE ADJUSTMENT: (Covered by U. S. Patent 2,122,615). Allows actual recording of correct pressure settings at each pass for each diameter and gauge tube.

HIGH SPEED WELDING: Latest type high speed welding head—and pressure roll equipment developed in collaboration with Linde Air Products Company, gives highest speeds consistent with quality of product and economical welding method.

CUT-OFF: High speed rotary head or rotary saw available, to suit requirements.

The above represents only a few of the advantages of McKay equipment. Call on us for complete information, samples and demonstration.

THE McKAY MACHINE CO.
Engineers and Manufacturers of
SHEET, TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

McKAY McKROMETER ADJUSTING

Army Plane Order Largest in Peace-Time

WASHINGTON — Representing the largest single peace-time order ever to be made by the War Department, tentative awards aggregating $100,000,000, of which $64,113,000 is for aircraft and $21,865,000 for engines were announced last week by the department. Contracts went to these companies:

For the four-engine bombardment planes—Consolidated Aircraft Corp., San Diego, Cal., $8,485,000; Boeing Aircraft Co., Seattle, Wash., $8,090,000. Options to the companies aggregated $5,400,000.

For the two-engine bombardment planes—Glenn L. Martin Co., Baltimore, $15,815,000; North American Aviation, Inc., Inglewood, Cal., $11,771,000.

For advanced training planes—North American Aviation, Inc., $1,326,000.

For basic training planes—North American Aviation, Inc., $2,707,000; Vultee aircraft division, Aviation Mfg. Corp., Downey, Cal., $2,986,000.

For primary training planes—Boeing Airplane Co., Stearman Division, Wichita, Kan., $688,000; with an option of $2,000,000.

For twin-engine interceptor pursuit planes—Lockheed Aircraft Corp., Burbank, Cal., $4,845,000.

Contracts for engines totaling $21,865,000 went to the following companies:

United Aircraft Corp., Pratt & Whitney division, Hartford, Conn., $12,320,000; Wright Aeronautical Corp., Paterson, N. J., $7,000,000; Allison Engine Corp., Indianapolis, Ind., $2,275,000; Aviation Corp., Lycoming Division, Williamsport, Pa., $270,000.

These awards, the department said, represent the major part of purchases to be under the Air Corps expansion program. Additional types are under consideration and awards will be announced shortly to complete the program. Awards for airplanes, engines, and accessories amounting to $50,000,000 had been previously announced.

NLRB Issues New, But Altered, Order Against Ford Motor Co.

WASHINGTON — Revising its original order against the company in several important respects, the National Labor Relations Board has issued another cease and desist order against the Ford Motor Co., charging Wagner Act violations at the River Rouge plant and ordering the company to discontinue the alleged practice of discouraging membership in the UAW, of threatening, assaulting, beating or interfering with workers because of union membership or other "self-organization activities."

The board, however, dismissed its former charge that the firm had dominated or interfered with the formation or administration, or contributed support to, the unaffiliated Ford Brotherhood of America, Inc., and it reduced from 29 to 24 the number of employees who would be reinstated with back pay under the terms of the order.

Original Order Vacated

The NLRB vacated its original decision issued in December, 1937, because it desired to correct possible procedure deficiencies which, the board feared, would endanger its position when the case reached the Supreme Court. It already has been to the Supreme Court once on a technicality and the Ford company unsuccessfully attempted to prevent the Sixth United States Circuit Court of Appeals from remanding the case to the board for the correction of procedural errors.

Counsel for the company had argued that the board's original order constituted an unconstitutional abridgment of the freedom of speech and freedom of press guaranteed by the first amendment to the Constitution because of the provision directing the firm to discontinue "circulating, distributing or otherwise disseminating among its employees" statements or propaganda which disparages or criticizes labor organizations or which advises its employees not to join such organizations." The board answered, however, that the distribution of such literature "interfered with, restrained and coerced" employees and it included in the latest order the controversial section.

Referring to "Fordisms" remarks by Henry Ford and to statements appearing in the "Ford Almanac," the board went into detail in its press announcement on the May 26, 1937, rioting at the River Rouge plant.

"The act," the NLRB said, "requires the employer to refrain from acts that interfere with, restrain or coerce employees in the exercise of their rights to self-organization and collective bargaining. The guarantee of such rights to the employees would indeed be wholly ineffective if the employer, under the guise of exercising his constitutional right of free speech, were free to coerce them into refraining from exercising the rights vouchsafed them in the act."

Employment Increases In Bridgeport Plants

THIRTY industrial plants in Bridgeport, Conn., on June 29 had 14,834 employees, compared with 14,754 a week earlier and 14,260 a month earlier. The average number of employees during 1932 was 9991.

Protect Your Workers with
MORTON'S SALT TABLETS

Heat-Fag and hot weather travel together. You can't stop the weather — but, you *can protect your workers against Heat-Fag* and stop the sag in the production line by placing Morton's Salt Tablets at every drinking fountain. These handy little tablets represent the easiest and most convenient way to replace the vitally needed body salt that's sweated out by hard work on hot days.

MORTON'S SALT TABLETS
Dissolve in 50 Seconds

Workers find them easy to take with a drink of water. They dissolve quickly. Only the purest and most highly refined salt is used.

MORTON'S DISPENSER . . . Sanitary, Economical, Convenient

Install Morton's dispensers and salt tablets in your plant now. Get ready for the hot days ahead. Remember—a small investment now will protect the health and efficiency of your workers when Heat-Fag threatens your plant. Shipments will be made promptly — prepaid.

Write for folder—"Heat-Fag"

MORTON SALT COMPANY CHICAGO, ILLINOIS

Registration Points to New Machine Tool Show Record

BASED on heavy advance registrations, including those from a score of foreign countries, attendance of industrial executives at the 1939 Machine Tool Show, to be held Oct. 4-13 at Cleveland, will break all records, according to Walter W. Tangeman, vice-president of the Cincinnati Milling Machine Co. and chairman of the show committee.

Actual exhibit space will total 150,000 sq. ft., nearly 15 per cent over that of the 1935 show. Power requirements for machinery that will be in operation have likewise been considerably increased—to 9000 hp. When the first Machine Tool Show was held 10 years ago, only 5000 hp. was required.

Special lighting has been arranged in the exhibit halls—far superior to the best available in 1935—and the physical arrangement of the exhibits themselves has been planned with a view toward insuring maximum visibility and minimum crowding.

Depression Speeds Research

"We expect the visitors at this show," says Wendell E. Whipp, president of the National Machine Tool Builders' Association, "to be amazed at the developments which they will find have been taking place in the machine tool industry in the last few years.

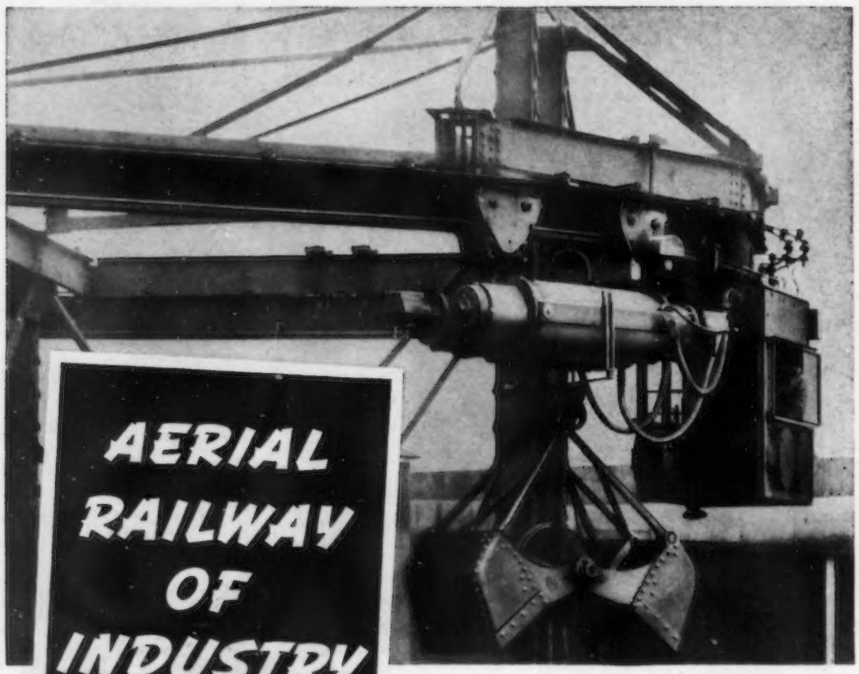
"In the depths of the 1929-1933 depression machine tool research departments and engineers took advantage of slack times to search for new methods and new improvements which they knew would be required to meet the increasingly exacting demands of America's manufacturing enterprises when recovery arrived.

"At the 1935 show, some of the fruits of this research had taken form—but a large share of the new concepts and ideas originated during depression days still required further testing and development before they could be placed on the market. During the last four years this testing and development has taken place. The machines which will be shown at this year's show represent, in fact, the culmination of a 10-year period of intensive research and engineering study, designed to make available to American industries methods of cost reduction and increased productivity which, I am convinced, substantially surpass, in performance, machine tool equipment which has thus far been available."

What Exhibitors Plan

Some of the exhibitors are already announcing their plans for the show. Ajax Mfg. Co., Cleveland, will exhibit among other machines an improved 500-ton forging press and their No. 6 continuous drawing and straightening machine. Blanchard Machine Co., Cambridge, Mass., will show an entirely new and improved type surface grinder and an adjustable gap demagnetizer for demagnetizing tools, dies and small parts in production. Buffalo Forge Co. will display six units representative of its line of punches, shears and bending rolls, each with distinctive new features.

Cincinnati Milling Machine will have 13 precision grinders and 15 milling machines in operation. Cincinnati Shaper Co. will display two



• One Shepard Niles electric monorail hoist gives "express service", indoors or out to any point in the plant or yard carrying loads of every description. Furnished with single or double hooks in capacities from ⅛ to 10 tons.

They are also ideally suited to the accurate control of any standard electromagnet or grab bucket.

Write for catalogs illustrating and describing the "Aerial Railway of Industry".

Shepard Track consisting of two special analysis T-rails clamped to the bottom flange of a standard I-beam insures a smooth, hard, long-wearing track for monorail hoists.

A COMPLETE LINE OF CRANES & HOISTS

SHEPARD NILES CRANE & HOIST CORP.

356 SCHUYLER AVENUE . . . MONTOUR FALLS, N. Y.

shapers, a squaring shear, and a new press brake. Cleveland Automatic Machine Co. will feature its new single spindle automatic, model AA. Ford Motor Co. will show a complete line of Johansson gage blocks and accessories.

The exhibit of Gisholt Machine Co., Madison, Wis., will contain three ram type turret lathes with a new speed selector and several improved automatic lathes. Hanchett Mfg. Co., Big Rapids, Mich., will show five representative grinding machines, all new or newly redesigned, and R. G. Haskins Co., Chicago, will display its new air-controlled tapping machine. Kearney & Trecker Corp., Milwaukee, will demonstrate 14 milling machines, including several not as yet announced.

New Boring Machines

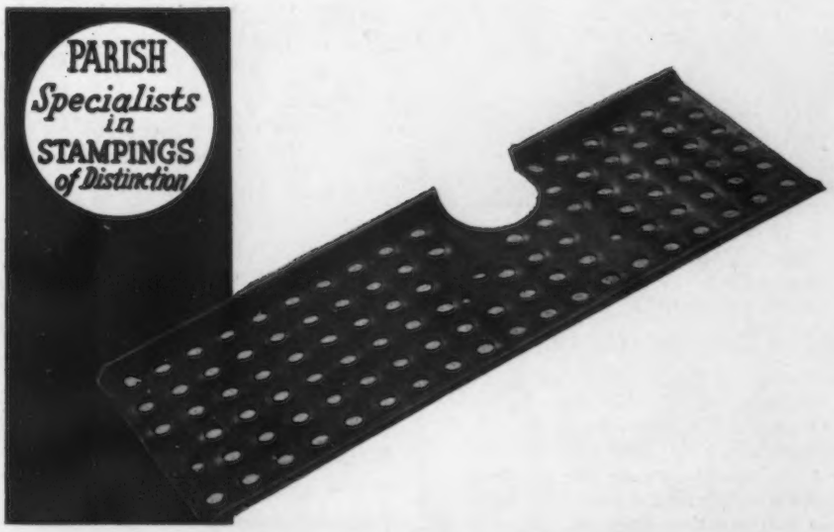
Landis Machine Co., Waynesboro, Pa., is planning a display of die heads, collapsible taps and threading units, including a hydraulically controlled double-head threading machine. Moline Tool Co., Moline, Ill., will exhibit an entirely new machine for fine boring cylinders and cylinder sleeves. National Broach Co. will show seven units, including their Rotomill, Rotoshaving and lead comparator machines just recently announced to the trade. The Norton Co. exhibit will include 12 machines doing production grinding work and numerous Zeiss measuring instruments and gages used for measuring and classifying surface finishes.

Peerless Machine Co., Racine, Wis., will show four metal sawing machines including an entirely new 14 x 14 in. capacity machine with automatic feed. The Reed-Prentice Corp. exhibit will include an improved 14 x 30 in. model B lathe, an 8-oz. plastic injection molding machine and a No. 1½ zinc die casting unit. Sundstrand Machine Tool Co., Rockford, Ill., will show a model 10 automatic lathe with glass replacing metal in covers and guards to make visible most of the moving parts. Feature of the Warner & Swasey exhibit will be three new turret lathes not as yet announced.

British Scrap Imports Rise to 25,000 tons in Week

LONDON—All sorts of new records are being put up by the British iron and steel industry as a result of the acceleration of the rearmament program. The latest is in scrap imports which, after a lull, had reached about 25,000 tons a week by the end of July. This figure is unlikely to be surpassed, as handling facilities at the ports are now fully employed. Moreover, in order to minimize the United Kingdom's reliance on foreign scrap a number of leading steel concerns are building additional blast furnaces.

The latest chartering fixtures show that 11 vessels have been taken to convey 82,000 tons of scrap from the United States to British ports during August and September. For the present no further shipments have been arranged for Poland, Italy and Japan, which countries, especially Japan, have been taking considerable tonnages during recent weeks. Chartering rates have been well maintained, the rate of 18s. per ton being repeated from the Atlantic range to the United Kingdom several times, while at the moment more attention is being paid to the shipment of cargoes from the Gulf ports on the basis of 20s. 6d. per ton.



Safety for the Brakemen

Neither the gauge, size nor specifications of a stamping presents any obstacle to Parish. Skill, experience and equipment combine to make difficult stampings comparatively easy in Parish shops.

This non-skid brake step for box cars is 1/4" thick x 30" long x 10" wide. The flange is 1". Embossing around the holes makes the step non-skid. Another of the many types of stampings produced by Parish for many industries.

Have you a problem that could be worked out in pressed metal? Our engineers will do it for you.

PARISH PRESSED STEEL CO., Reading, Pa.

PACIFIC COAST REPRESENTATIVE
F. Somers Peterson Co., 57 California St., San Francisco, Calif.

. . . THE NEWS IN BRIEF . . .

Five to 10 per cent price cut to be general in auto industry for 1940. Optimism expressed for fall outlook as new models are previewed. Packard joined by Dodge, Nash and Hudson in resumption of production. Assemblies at 24,875; may reach bottom this week.—**Page 58.**

Department of Justice to present (on or about Oct. 15) the "most penetrating" study ever made of the steel industry.—**Page 62.**

Labor Board orders tool and die workers at St. Louis reinstated.—**Page 62.**

Government spending will stimulate business well into 1940.—**Page 64.**

Secretary Hopkins appoints six "spark-plug" boys' to stimulate the Department of Commerce.—**Page 64.**

War Resources Board of six civilians, headed by E. R. Stettinius, is set up at Washington.—**Page 66.**

War Department awards for artillery and special machinery $3,471,370 in half month.—**Page 66.**

Commodity Credit Corp. orders 25,000 corn cribs, requiring 25,000 tons of galvanized sheets.—**Page 66.**

Government contracts for steel $618,755 for latest reported week.—**Page 68.**

Secretary Perkins warns against premature reliance on aluminum dust as preventive of silicosis.—**Page 69.**

NLRB orders Westinghouse employees at Lima, Ohio, to vote for CIO or independent workers' association.—**Page 70.**

$100,000,000 plane order, largest in Army's peace-time record, is awarded by War Department.—**Page 70.**

Employment increases in Bridgeport plants.—**Page 71.**

NLRB issues new, but altered, order against Ford Motor Co.—**Page 71.**

Heavy registration points to new attendance record for 1939 Machine Tool Show (Oct. 4-13 at Cleveland).—**Page 72.**

British scrap imports rise to 25,000 tons in week.—**Page 73.**

Business can feel encouraged but should not be held responsible for recovery without further action by Congress, N.A.M. leader says.—**Page 76.**

International Harvester offers two new tractors.—**Page 76.**

SECTIONS INDEX

Personals	78
Obituary	80
Capital Goods Index	83
Steel Ingot Production	83
Summary of the Week	84
Comparison of Prices	85
Pittsburgh, Chicago, Cleveland, Philadelphia and New York markets	86
Scrap Market and Prices	90
Finished Iron & Steel	92
Pig Iron & Raw Material Prices	94
Warehouse Prices	95
Fabricated Steel	98
Non-ferrous Market	99
Plant Expansion & Equipment	100
Machine Tool Activity	102

MEETINGS

Aug. 28 and 29—Institute of Scrap Iron and Steel, Cleveland.

Aug. 28 to 31—American Mining Congress, Salt Lake City.

Sept. 4 to 8—British-American Engineering Congress, New York.

Sept. 8 and 9—American Ceramic Society, Conneaut Lake, Pa.

Sept. 14 to 17—National Association of Foremen, Pittsburgh.

Sept. 20 to 22—National Industrial Advertisers Association, New York.

Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 4 to 13—National Machine Tool Builders' Association, Cleveland.

Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.

Oct. 6 to 7—Foundry Equipment Manufacturers Association, White Sulphur Springs, W. Va.

Oct. 16—Society of Automotive Engineers, annual dinner, New York.

Oct. 16 to 20—National Safety Congress and Exposition, Atlantic City, N. J.

Oct. 23 to 27—National Metal Congress, Chicago.

Gear sales in July 1 per cent under June and 34 per cent above July, 1938.—**Page 77.**

American Foundrymen's Association sets May 6-10 for annual convention at Chicago.—**Page 77.**

Employees on vacation advertise "Peoria—Home of Caterpillar."—**Page 77.**

Work starts on Tennessee Coal, Iron & Railroad Co.'s new ore conditioning plant.—**Page 77.**

U. S. leads world in output of mattress spring wire.—**Page 77.**

Westinghouse Electric & Mfg. Co. plans 1000-foot bridge at Mansfield plant.—**Page 77.**

New roll shop of Ohio Steel Foundry Co.—**Page 82.**

New Zealand to build $25,000,000 steel plant.—**Page 82.**

Republic strip mill sets new rolling record.—**Page 82.**

U. S. Steel Corp. finished steel shipments in July 53 per cent over year ago.—**Page 82.**

3500 Weirton workmen see World's Fair for $9 each.—**Page 82.**

Utility orders 500 towers from Blaw-Knox Co.—**Page 90.**

Armco's hot strip mill at Middletown, Ohio, resumes production after completion of new slabbing mill.—**Page 95.**

Mike Tighe sees end for CIO-AFL unless feud is dropped.—**Page 95.**

Formed Metal Plumbing Ware Association is organized.—**Page 95.**

Railroads liberalize demurrage rates for shippers and receivers on Oct. 1.—**Page 96.**

National Association of Credit Men executive forecasts improved business after Labor Day.—**Page 96.**

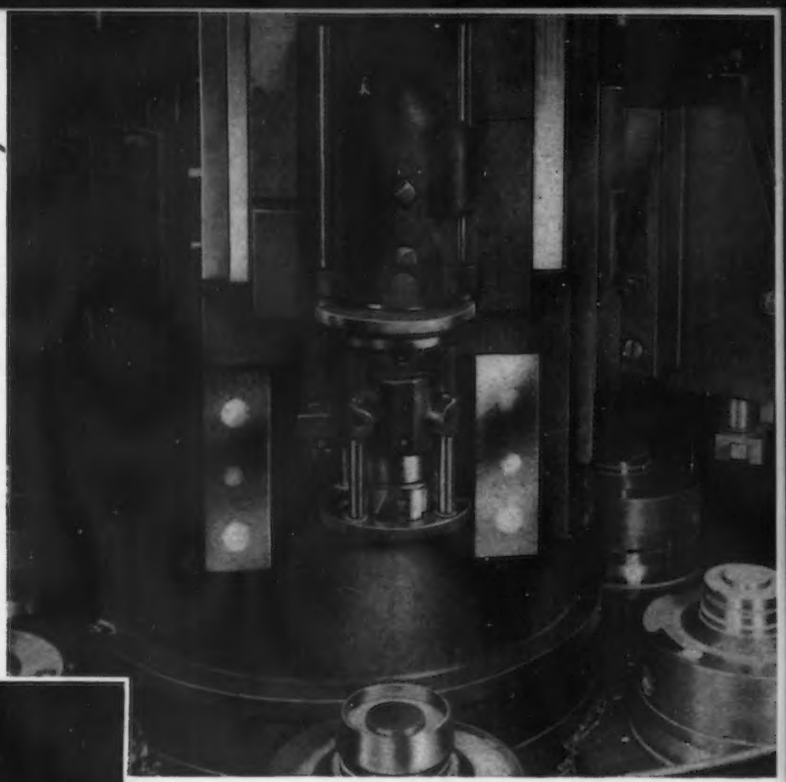
Unions win more closed shops agreements and contracts including check-off of dues, National Industrial Conference Board survey finds.—**Page 102.**

Machine tool order index reaches 230.9 in July as domestic demand broadens.—**Page 102.**

MULT-AU-MATIC

BULLARD

"Profit" YIELD Every 47 SECONDS



One manufacturer did it this way. Two machines—1st and 2nd chucking—Machining an Adaptor from solid bar stock. Operations were rough and finished turning, necessary taper twining and threading. Two Bullard 8" 6-Spindle Mult-Au-Matics each turned out a piece every 47 seconds and showed such an amazingly low cost that the manufacturer, an English concern, could add freight, insurance, duty, and other charges to the machine cost and still make a big profit on the purchase.

Equal profits may be yours—if you will call in Bullard Engineers. Their estimates cost you nothing.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Further Action Needed, NAM Tells Congress

AMERICAN business should gather "encouragement and confidence" from current conservative trends in Congress, but it cannot be held responsible for recovery without "further positive action" by the nation's legislative branch, Howard Coonley, president of the National Association of Manufacturers, said in a letter to the association's membership.

"The effect of 10 years' experimentation with our economic machinery cannot be overcome even with the best of intentions and the most determined efforts of business management until those experiments are abandoned or adjusted to experience," Mr. Coonley said in the letter which went to the association's 7600 members.

Touching directly on Congressional action as related to the problem of recovery, Mr. Coonley said:

"Considerable over - emphasis is placed on the claim that Congress 'has accepted industry's challenge' and that responsibility for complete recovery has now been shifted to business. It is true that Congress has slowed down some of the unsound trends which have penetrated our national thinking. This was apparent not only in what they refused to do, but also in the start made toward the correction of existing defects. Final action on most of these corrections was postponed until the next session. The results, therefore, were principally psychological. Substantial and sound recovery depends upon further positive action by Congress." He added:

"Let us be quite frank in saying that failure to amend the National Labor Relations Act, in the face of such evidence as was produced before Congress, and with public sentiment overwhelmingly for change, can be considered a serious setback to business. Investigation of the National Labor Relations Board is important, but it does not remove the drawbacks to employment involved in the defects of the Wagner Act."

HERE'S a hand — ready to help; the trained, experienced hand of your Wyandotte Service Representative, ready to help you in your daily battle to get the best and the fastest metal cleaning at minimum cost per unit cleaned.

Probably you are already familiar with Wyandotte Service — most metal finishers regard it as an essential part of their metal-cleaning operations. But if you haven't learned how helpful your Wyandotte Service Representative can be, call him today. You'll find he can bring you instant, expert help on *any* metal cleaning problem that you may have. There is no obligation for his services, of course.

THE J·B·FORD SALES CO·
WYANDOTTE MICHIGAN
SERVICE REPRESENTATIVES IN 88 CITIES

International Harvester Offers Two New Tractors

ROCK ISLAND, Ill.—The International Harvester Co., at its Farmall works here last week introduced to the public two new tractor models, the Farmall-H, and the Farmall-M. These two tractors primarily are intended for farms over 70 acres in size, as opposed to the small Farmall-A, described on p. 128-B of the July 13 issue of THE IRON AGE, which was designed chiefly for farms of less than 70 acres. The H model sells for $695 on steel wheels, and $855 on rubber tires, while the base price of the M is $895 on steel wheels, and $1070 on rubber. The feature of the new tractors is the "Lift-All," a hydraulic mechanism for the raising and lowering of tractor-mounted implements. On rubber tires these models have a top speed of 16⅜ m.p.h and five forward speeds, ranging as low as 2⅝ m.p.h.

Lamson & Sessions Co., Cleveland, has appointed J. J. Brown Sales Co., 129 West Second Street, Los Angeles, and 420 Market Street, San Francisco, sales representative for California. The Los Angels office will be under the direction of James Brown and the San Francisco office, of W. Barret Brown.

Work Starts on T. C. I.'s Ore Conditioning Plant

THE Tennessee Coal, Iron & Railroad Co. has placed with the Rust Engineering Co. a contract covering excavation work and concrete foundations for the central ore conditioning and sintering plant to be erected at the Wenonah division of the company's Red Mountain ore mines. The excavation and concrete work will be started immediately and is expected to require about six months. The new plant is expected to be ready for operation in the late summer or autumn of 1940.

Westinghouse Plans 1000-Ft. Bridge at Mansfield

AN industrial bridge 1000 ft. long is planned by the merchandising division of Westinghouse Electric & Mfg. Co. at its Mansfield, Ohio, plant. This bridge, believed to be the longest of its kind, will be used to transport range and refrigerator parts between the present manufacturing aisles and the Westinghouse vitreous-enamel plant. It will house 3100 ft. of chain and 1500 ft. of belt conveyors, as well as a light-trucking and pedestrian aisle.

Gear Sales in July Were 34 Per Cent above Year Ago

GEAR sales in July were 1 per cent under June but 34 per cent above July, 1938, the American Gear Manufacturers Association reports. Sales in the first seven months of the present year are 21 per cent higher than in the comparable period of 1938.

U. S. Leads World in Mattress Wire Output

AMERICA leads the world in production of mattress spring wire and of mattresses and cushions of inner spring construction in which it is used.

One consignment of mattress wire, recently loaded for export at Bethlehem Steel Co.'s Maryland plant, Sparrows Point, Md., weighed 176,000 lb., enough for 10,000 inner-spring mattresses.

It is estimated that America produces 150,000 to 200,000 tons of spring wire annually. The value of inner-spring mattresses produced in 1937 was 32 per cent greater than in 1929, the industry's best previous year.

May 6-10 in Chicago Is Date Set for 44th A.F.A. Meeting

THE 44th annual convention of the American Foundrymen's Association will be held in Chicago from May 6 to 10, the association's board of directors has decided. There will be an extensive exhibit of foundry equipment and supplies held in conjunction with the convention. The equipment exhibit will be housed in the International Amphitheater of the Union Stock Yards & Transit Co., while the business meetings are scheduled to be held in the Stock Yards Inn, the Saddle and Sirloin Club and the Amphitheater. Headquarters will be at the Palmer House.

"Peoria—Home of Caterpillar"

EMPLOYEES of Caterpillar Tractor Co., Peoria, Ill., recently completed a two-weeks' vacation which took many of them across the country. Each of the 7000 employees taking the holiday was given a black and yellow metal tag for his car. It said:

"Peoria—Home of Caterpillar."

CLEVELAND TRAMRAIL

OVER HEAD HANDLING EQUIPMENT

● Cleveland Tramrail Hand Propelled Cranes and Carriers for inexpensive yet efficient service in warehouse and shop stock rooms.

Cleveland Cranes and Carriers carry a

Guaranteed { starting effort 15 pounds / running effort 10 pounds } per ton of total load

ALSO BUILDERS OF CLEVELAND CRANES ALL WELDED

CLEVELAND TRAMRAIL

Division of

THE CLEVELAND CRANE & ENGINEERING CO.

1115 Depot St.

WICKLIFFE, OHIO.

Or Consult Your Phone Directory under Cleveland Tramrail

PRECISION SCREENS

INDUSTRIAL ORNAMENTAL

● ANY METAL

ANY PERFORATION ●

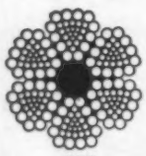
● Perforated metal is for a thousand uses, some of which require precision workmanship to accomplish results otherwise impossible.

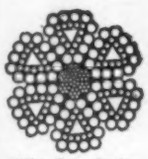
● Whatever you require in perforated metal, we are here to produce, either the commonplace, the difficult, or the precision. Your inquiries will have our best attention.

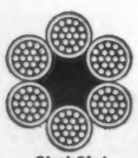
The Harrington & King PERFORATING CO.

5657 FILLMORE ST., CHICAGO 114 LIBERTY ST., NEW YORK

Style B Flattened Strand


"B" Flattened Strand


Wire Rope Center


Steel Clad

You Can Depend On "HERCULES"* (Red-Strand) Wire Rope...

There is no guesswork when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. Furnished in a wide variety of constructions so as to be suitable for all purposes—each backed by 81 years of manufacturing experience and close cooperation with users.

—PREFORMED—

For maximum efficiency in Preformed Wire Rope, use Preformed "HERCULES". It is available in both Round Strand and Flattened Strand constructions.

Made Only By

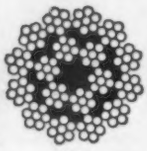
A. LESCHEN & SONS ROPE CO.

Established 1857

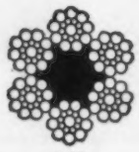
5909 KENNERLY AVENUE, ST. LOUIS, MO.

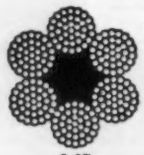
New York . . . . 90 West Street
Chicago . 810 W. Washington Blvd.
Denver . . . . 1554 Wazee Street
San Francisco . 520 Fourth Street
Portland . 914 N. W. 14th Avenue
Seattle . . 2244 First Avenue South

* Reg. U. S. Pat. Off.


18x7 Non-Rotating

6x19 Filler Wire


6x19 Seale


6x37 Extra Flexible

8x19 Extra Flexible

. . . PERSONA

J. D. SULLIVAN, formerly identified with the Gates Rubber Co., as division manager for the industrial division of sales, has been appointed sales manager of the special products division of Colorado Fuel & Iron Corp., Denver.

❖ ❖ ❖

FRANK MEREDITH, for many years with United States Steel Corp. subsidiaries, has been appointed assistant superintendent of industrial relations at Carnegie - Illinois Steel Corp.'s Sharon-Farrell plants.

❖ ❖ ❖

PAUL S. MENOUGH, formerly with the Duraloy Co., Michigan Steel Casting Co., and Michiana Products Co., has been named chief engineer by the Standard Alloy Co., Cleveland. FRANK P. MORROW, who has been located in Detroit as district manager for the Standard Alloy Co. for the past six years, has been made sales manager and will take up his new duties in Cleveland on Sept. 1.

❖ ❖ ❖

WALTER P. CAHILL, general superintendent and member of the board of Graton & Knight Co., Worcester, Mass., has resigned. He has been with the company for about 20 years.

❖ ❖ ❖

JESSELL S. WHYTE, official of the Macwhyte Co., Kenosha, Wis., has been reappointed to a six-year term as employer member of the Wisconsin Board of Vocational and Adult Education by Gov. Julius P. Heil. His term expires July 1, 1945.

❖ ❖ ❖

JOHN H. ELLIOTT has been appointed assistant to general superintendent of Carnegie-Illinois Steel Corp.'s Irvin works, near Clairton, Pa. WILLIAM A. MARSHALL has been made division superintendent, tin finishing, succeeding Mr. Elliott; Row E. HOWELL has been made assistant division superintendent, tin finishing; WARREN W. SCHERER has been appointed superintendent of maintenance, succeeding Mr. Marshall; and ARTHUR M. KRIEGER has been made assistant superintendent of maintenance, succeeding Mr. Scherer.

❖ ❖ ❖

A. S. HAMILTON has been appointed district manager of Wheeling Steel Corp.'s Buffalo territory, succeeding S. M. HOPKINS, who resigned to become connected with the Seneca Steel

SNALS . . .

Service Corp. Mr. Hamilton has been engaged in sales work at the Buffalo office of Wheeling Steel for several years.

❖ ❖ ❖

KENNETH J. BURNS has been made sales manager of the district sales office which Inland Steel Co. will open soon in Cincinnati. This office will have supervision over sales in Ohio and eastern Kentucky. Until recently Mr. Burns was district sales manager for Youngstown Sheet & Tube Co. at Youngstown. He has been associated

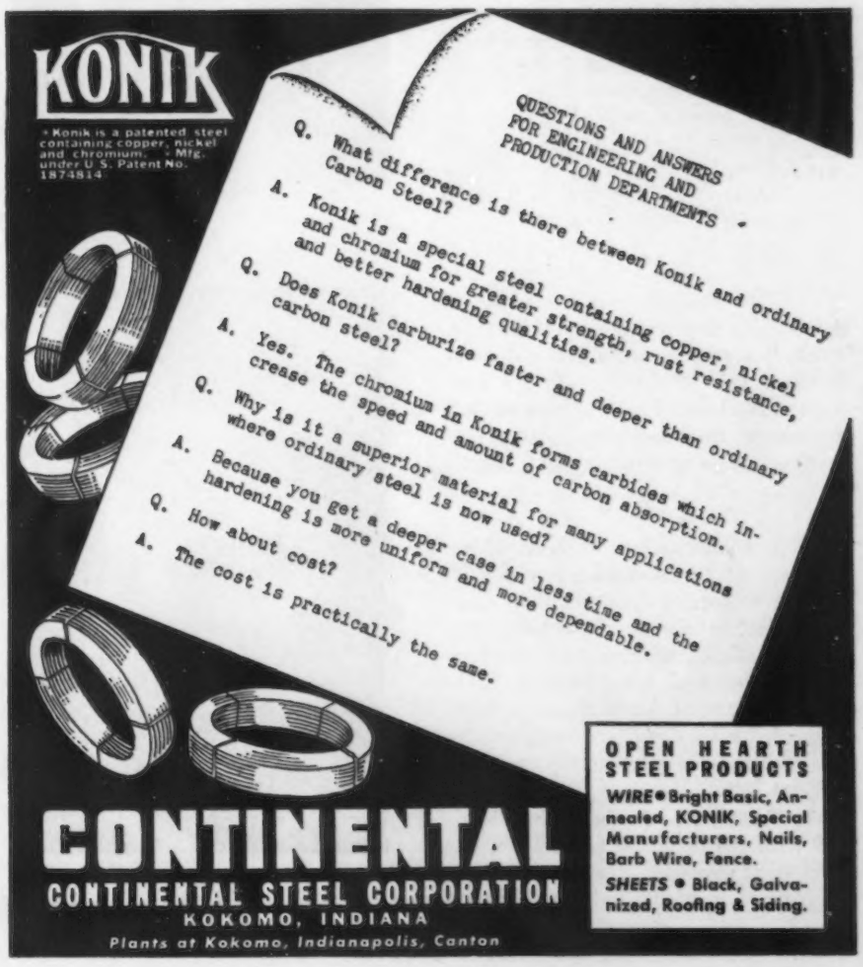
J. D. SULLIVAN

with that company since 1917 and has served as a salesman in its Cleveland office and as manager of sales in its Cincinnati and Indianapolis offices, as well as at Youngstown. Between 1929 and 1934 he was assistant manager of sheet and plate sales in the general offices at Youngstown.

❖ ❖ ❖

J. H. VOGEL, who became identified with the York Ice Machinery Corp., York, Pa., in 1915 as an apprentice in the industrial course, has been appointed general works manager of the company. Upon graduating from Penn State in 1923, he continued with the company as an outside erecting engineer. Three years later he was assigned to special developments in the superintendent's department and later was made assistant superintendent. He was made assistant works manager in

"All it needs now is a spring!"
Better see DUNBAR
BROS. COMPANY
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"They've been making quality springs for nearly one hundred years"


KONIK
• Konik is a patented steel containing copper, nickel and chromium. • Mfg. under U. S. Patent No. 1874814
QUESTIONS AND ANSWERS FOR ENGINEERING AND PRODUCTION DEPARTMENTS
Q. What difference is there between Konik and ordinary Carbon Steel?
A. Konik is a special steel containing copper, nickel and chromium for greater strength, rust resistance, and better hardening qualities.
Q. Does Konik carburize faster and deeper than ordinary carbon steel?
A. Yes. The chromium in Konik forms carbides which increase the speed and amount of carbon absorption.
Q. Why is it a superior material for many applications where ordinary steel is now used?
A. Because you get a deeper case in less time and the hardening is more uniform and more dependable.
Q. How about cost?
A. The cost is practically the same.
OPEN HEARTH STEEL PRODUCTS
WIRE • Bright Basic, Annealed, KONIK, Special Manufacturers, Nails, Barb Wire, Fence.
SHEETS • Black, Galvanized, Roofing & Siding.
CONTINENTAL
CONTINENTAL STEEL CORPORATION
KOKOMO, INDIANA
Plants at Kokomo, Indianapolis, Canton

charge of methods and equipment in 1934.

❖ ❖ ❖

E. A. FAULHABER has retired as executive vice-president of Compressed Industrial Gases, Inc., Chicago, after 25 years of service with the company and its predecessors. Mr. Faulhaber retains his interest in the company and will remain with the company as a director and in an advisory capacity.

❖ ❖ ❖

CHARLES L. ANGER has joined the Detroit district sales staff of Hanson-Van Winkle-Munning Co., Matawan, N. J. He will make his headquarters at 2842 West Grand Boulevard. JOHN A. BAUER, who has been in charge of the New York office of the company for several years, has been transferred to Matawan to assist L. M. Hague, vice-president in charge of sales. IRVING A. GEMMELL, heretofore of the engineering department at Matawan, has been placed in charge of the New York office.

❖ ❖ ❖

CARL C. JOYS, JR., associated with the A. O. Smith Corp., Milwaukee, Wis., since 1924, has announced his resignation as vice-president and director of the company. He has made no announcement as to his future plans, and no successor has as yet been appointed to fill the vacancy. He joined Smith when its welding department was inaugurated. For years he has had charge of all Smith sales, except automobile frames, including pipe for oil and natural gas, beer tanks, and oil cracking vessels.

❖ ❖ ❖

H. VON THADEN, vice-president of the Robins Conveying Belt Co., New York, has returned from an extensive business visit in Chile, where a contract was closed for a system of belt conveyors to handle coal from an undersea mine to a preparation plant.

❖ ❖ ❖

G. R. PROUT, who has been acting manager of the southwestern district for the industrial department of General Electric Co., Schenectady, has been appointed manager of sales of industrial control, effective Sept. 1. He is a graduate of Massachusetts Institute of Technology and entered the small motor department of the company at Lynn, Mass., in 1923.

W. T. DARCY, who has been identified with the company since 1925, has been made manager of sales of renewal parts division of the industrial department. He has served as assistant to W. C. YATES, manager of the control and renewal parts division of GE's industrial department since 1934.

❖ ❖ ❖

H. W. GRAHAM, for many years general metallurgist, Jones & Laughlin Steel Corp., Pittsburgh, has been made director of metallurgy and research. C. C. HENNING, assistant to Mr. Graham, becomes general metallurgist. The new titles, it was announced, involve no change in the organization set up of the department.

Mr. Graham's entire professional experience has been with Jones & Laughlin, he having been connected with this company since 1914. He is chairman of the executive committee of the Industrial Research Institute and is a member of a number of professional societies including American Society for Testing Materials, American Society for Metals, American Institute of Mining and Metallurgical Engineers, Engineers Society of Western Pennsylvania, American Iron and Steel Institute, The Iron and Steel Institute (British), and the Verein Deutscher Eisenhuettenleute (German Iron and Steel Institute).

H. W. GRAHAM

C. C. HENNING

Mr. Henning has also been identified with Jones & Laughlin during his entire professional career, joining the company in 1915 in the Pittsburgh works metallurgical department. In 1935 the American Institute of Mining and Metallurgical Engineers conferred upon him the Robert W. Hunt award for his paper, "The Manufacture and Properties of Bessemer Steel." Mr. Henning is a member of the American Society for Testing Materials and the American Society for Metals.

❖ ❖ ❖

TOM TURNER, who joined the Westinghouse Electric & Mfg. Co. in 1922 as a machinist at the East Pittsburgh, Pa., works, has become manager of the meter division at Newark, N. J. He has been superintendent of the Newark works since 1934.

❖ ❖ ❖

S. HORACE DISSTON, president of the Henry Disston & Sons, Inc., Philadelphia, was injured in the Nevada passenger train wreck early this week.

. . . OBITUARY . . .

FRED W. COOMBS, vice-president of the Gisholt Machine Co., Madison, Wis., until his retirement in 1937, died of a cerebral hemorrhage in an Orlando, Fla., hospital, where he had been receiving treatment for chronic sinusitis. He had been associated with the Gisholt company since 1895 when he joined the firm as bookkeeper and time clerk, becoming vice-president during ensuing years. Ill health forced his retirement. He was 69 years old.

❖ ❖ ❖

EUGENE TETZLAFF, president and founder of the Flour City Ornamental Iron Co., Minneapolis, died on Aug. 10, aged 74 years. A native of Germany, he came to this country in 1888 and worked as an artisan and superintendent of ornamental metal manufacturing plants. He started the company which he headed in 1893.

This Week on the Assembly Line

(CONTINUED FROM PAGE 60)

available on order. This follows identically the plan followed by Ford with the large Lincoln.

Claiming the largest volume of advance orders from the field in the history of the company, M. M. Gilman, president of Packard, announced the new line—the One-Ten, the One-Twenty, One-Sixty and the Super-8—with prices substantially lower. Reductions (compared with a year ago) are $120 on the lowest priced line, $150 on the One-Twenty and as much as $400 on the big eight. These reductions include the $100 to $300 cuts made early in May. The One-Sixty is a new car; it is an entirely new eight which is said to out-perform the old 12-cylinder car. To produce these cars and meet dealer demand, Packard is operating two shifts for the first time in a year and a half.

Hudson again centers attention on the light car field with a small six which will be competitive in price with the standard models of the Big Three, and with a deluxe six which will compete with the deluxe models of the Ford, Chevrolet and Plymouth lines. Independent suspension of the front end is featured, along with center-point steering and a sway bar installation known as auto-poise control. Companion cars will be the Hudson Eight, which has more than horsepower per inch of wheelbase, a new Hudson Super-Six, and a Country Club series of sixes and eights. Entirely new fabrics, and further use of foam rubber seats are among the features.

New directional safety signals, in which parking lamps molded into the hood side panel blink signals for turns, are introduced by Hudson. Incidentally, front grilles on all models are substantial looking die castings which extend the entire width of the catwalk sections. Hardly any mention was made by Hudson of another feature which will attract wide attention—the rear windows are curved to correspond with body curvature. The material is not glass; it is Herculite.

Prices on the Hudsons are being reduced about 5 per cent. Reductions range from $25 to $43. Similarly, Nash price cuts are rumored, but no statements or details about the cars will be available until announcement date.

HUDSON, for the first time in the low price field, introduces front wheel suspension with center point steering and patented auto-poise control. The engineer is indicating the center point steering with his right hand and is showing the direct connection of the auto-poise control (sway bar) with his left hand.

Willys, with $2,500,000 of RFC money assured, showed its cars on Friday last. Changes are minor, but appearance has been improved and both a standard and deluxe line will be available. Price reductions were said unofficially to range between $30 and $40 on each car. Willys this year offers the steering wheel gear shift on the deluxe cars, has slightly greater power, more economy of operation, softer riding springs. The engine has been improved by adding counterweights to the crankshaft; bearing loads are reduced and the engine is smoother.

For Joseph W. Fraser, formerly of Chrysler, it is first year as president of Willys. A meeting of stockholders on Aug. 14 ratified the RFC loan which will, in part, enable the firm to do a thorough job of advertising the car and strengthening the sales organization which now has some 1250 dealers.

With one or two exceptions, all auto makers are adopting the new non-glare headlamps which were first mentioned in this column weeks ago. They were demonstrated Monday in General Electric's Nela Park, at Cleveland, under sponsorship of the Automotive Safety Foundation. The new headlamp is a projector type, with lens, reflector and filament hermetically sealed against dirt or moisture. It has a permanently fixed focus, with double-life filament and greatly increased light output. Road lighting is said to be double in range and a third more intense than with present headlamps.

GE, Guide Lamp (of GM), Electric Auto-Lite and Hall Lamp Co. are making variations of the new design under cross-licensing agreements. The GE lamp is *all* glass, while the Hall lamp design has a metal reflector. The lens is said to be a pyrex type developed by Corning Glass Works.

Interesting, indeed, will be the educational experiment to be conducted by some of the companies using the lamps. They will paste stickers on windshields of new cars equipped with the more powerful lamps, advising owners that it is good etiquette to dim headlamps, or lower the beam with the toe switch, when meeting another car.

Greater engine power will be available in many of the 1940 cars, including Packard, Willys, the Nash Lafayette, and Hudson. Plymouth and Dodge will have definitely greater power output to offer when the cars are released, and in addition, wheelbases of both the Dodge and Plymouth are to be increased.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity	1938 Shipments	1938 Per Cent of Capacity	1939 Shipments	1939 *Per-Cent of Capacity
January	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7	789,305	51.8
February	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5	677,994	49.3
March	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2	767,910	50.4
April	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7	701,459	47.5
May	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2	723,165	47.4
June	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1	733,433	49.7
July	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8	676,309	44.5
August	624,497	37.3	923,703	59.6	1,107,858	72.6	553,634	36.3	.....	...
September	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5	.....	...
October	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1	.....	...
November	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6	.....	...
December	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2	.....	...
Minus yearly adjustment	(—23,750)	...	(—40,859)	...	(—77,113)	...	(+30,381)	...	.....	...
Total for year	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	6,655,749	36.7	.....	...

*Annual finished steel capacity 17,940,600 gross tons, with monthly percentages based on actual number of weeks in each month.

July Steel Corp. Shipments 53 Per Cent Over Year Ago

SHIPMENTS of finished steel products by subsidiary companies of U. S. Steel Corp. in July were 676,309 tons, equal to 44.5 per cent of the corporation's finishing capacity, and representing a gain of 53 per cent over July, 1938. July shipments were 57,124 tons below the June total of 733,433 tons, but this decline was seasonal in nature for July has shown a drop from the June figure in every year in the past ten years, with the exception of 1933 and 1936.

Shipments in the first seven months of the present year total 5,069,575 tons, as compared with 3,451,924 tons in the corresponding period of 1938, an increase of 1,617,651 tons or 47 per cent.

New Zealand to Build $25,000,000 Steel Plant

LONDON—The construction of an iron and steel plant at Onekaka, New Zealand, which was mentioned by Premier Savage in his budget speech on Aug. 1, is to be begun immediately. Premier Savage declared that the industry at Onekaka was to be developed at an estimated capital cost of £5,000,000 ($25,000,000).

The plant is expected to start production in 1942, and the initial production envisaged amounts to 104,000 tons.

Republic Strip Mill Sets New Rolling Record

CLEVELAND—The 98-in. continuous strip mill of Republic Steel Corp. established a new record for hot rolling steel on Thursday, Aug. 10, according to Howard B. Carpenter, Cleveland district manager. A total of 1900 gross tons of finished coils, amounting to 35½ miles of steel with an average width of 55 in. was rolled between 7 a. m. and 3 p. m. The previous world's record for hot rolling in a single 8-hr. turn, which represents seven hours of actual rolling time, was 1887 tons.

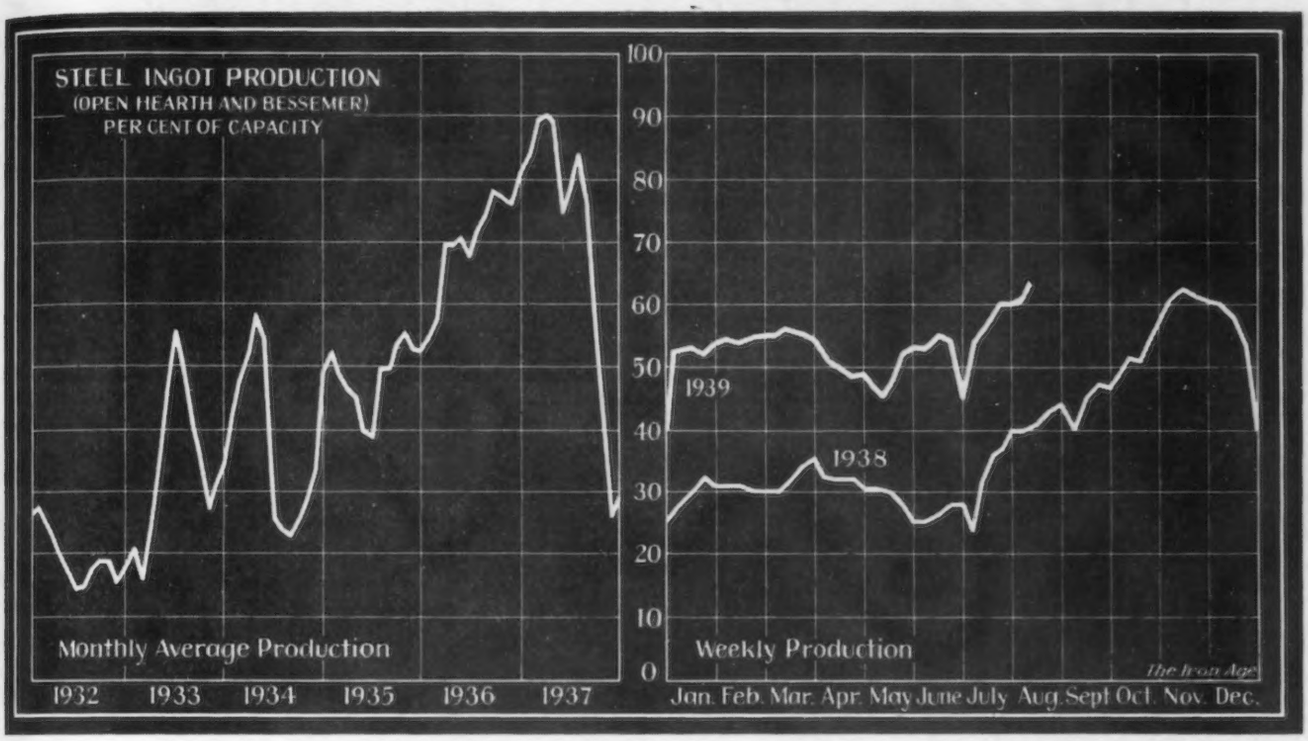
3500 Weirton Workmen See World's Fair for $9 Each

THIRTY-FIVE hundred employees of Weirton Steel Co. saw the World's Fair on Sunday, Aug. 13, at a total cost to them of $9 each. The $9 included transportation in a special train, breakfast and luncheon at the fair, and admission to Sun Valley, Frank Buck's Jungleland, Little Old New York and the Wild West Show.

New Roll Shop of Ohio Steel Foundry Co.

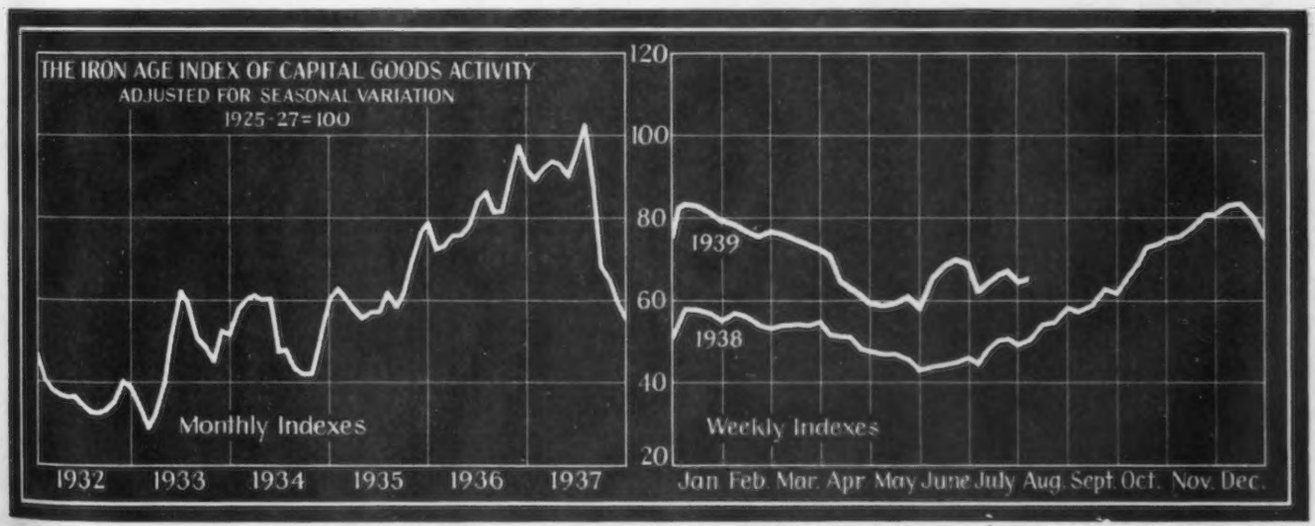
THE Ohio Steel Foundry Co., Lima, Ohio, is building a new roll shop, 190 x 220 ft., which is to contain as much heavy crane and machine equipment as is usually found in the largest plants in the country. The multiplicity of crane operations will be carried on without interference because the interrelation of these operations was studied carefully before construction was started. Special building foundations and machine foundations were required to prevent vibrations and interference which would hinder the high precision work done in the roll shop. The building was designed by Albert Kahn, Inc., Detroit.

Ingot Output at 62.5% Reaches 1938 Peak



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	57.0	58.0	54.0	45.0	81.0	59.0	80.0	79.3	75.0	58.0	54.0	60.0	75.0	**62.5**
PREVIOUS WEEK..	53.0	56.0	55.0	44.0	77.0	59.0	77.0	65.0	75.0	55.0	54.0	52.5	45.0	**61.0**

Strength in Steel and Building Factors Raises Index



CONTRASEASONAL advances in two of the components of THE IRON AGE capital goods index, steel production and heavy construction activity, caused the index to move slightly higher in the past week, despite continued weakness in the other three components. The gain, 0.3 point, brings the index up to 65.1. This position is two points below two weeks ago, but one point above a month ago. The improvement in the construction factor was due entirely to publicly financed projects. A further decrease in automobile assemblies was reported, but the week's total of 24,875 units was almost double the figure for the similar week of a year ago which marked the low point of the 1938-39 change-over period. An improvement in industrial production in Pittsburgh was counteracted by a falling off in shipments, particularly rail shipments, causing the adjusted Pittsburgh index to ease 0.2 point.

	Week Ended Aug. 12	Week Ended Aug. 5	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	88.3	86.7	57.1	132.8
Automobile production[2]	32.7	33.1	20.8	121.6
Construction contracts[3]	68.6	65.8	66.4	120.1
Forest products carloadings[4]	59.0	61.0	52.6	121.2
Production and shipments, Pittsburgh District[5]	77.0	77.2	54.1	127.8
Combined index	**65.1**	**64.8**	**50.2**	**124.7**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Ingot production at 62½ per cent equals high point of 1938.

° ° °

. . . Scrap composite moves up to $15.46; markets strong.

° ° °

. . . Better steel situation marked by continuing price strengthening.

STEEL ingot production at 62½ per cent this week equals the high point of 1938, in November. Higher operating rates in a number of centers are accompanied by a further strengthening of scrap prices, raising THE IRON AGE scrap composite price to a new high of $15.46, or 17c. above the spring peak of $15.29.

The improved steel situation is also marked by a closing up of the weak spots in steel prices. Despite the large amount of low-priced business still on mill books, the current situation is the firmest it has been since 1937. An indication is the increasing amount of sheet and strip business that is being booked at full published prices. Since Aug. 10 the reinforcing bar price situation has been considerably strengthened. Plates are more generally quoted at 2.10c. a lb., basing points.

Steel operations are up more sharply in some districts than in others. The Pittsburgh district has gained four points to 57 per cent, the highest rate there since October, 1937, while Chicago has gained two points to 58 per cent, the Cleveland-Lorain district four points to 81 per cent, the Wheeling-Weirton district three points to 80 per cent and the Detroit district has jumped from 65 per cent to 79 per cent, with a further gain in prospect for next week when the Ford steel plant will be running full. There have also been gains in Southern Ohio, in Eastern Pennsylvania and at St. Louis. A slight loss has occurred at Youngstown.

WHILE orders from the automobile industry are increasing, the full volume of business for initial production of 1940 models has not yet developed. It is expected that steel operating rates in September will be above the August average because of a larger volume of rollings for motor car makers. A factor in current operating rates is the insistence of the mills that specifications for low-priced sheet and strip tonnage be submitted by the end of this month, the Sept. 30 deadline for such shipments applying to all but automotive-buyers. The volume of sheet specifications being received by some mills is as much as 20 per cent over those in the comparable July period.

Virtually all steel products except plates are registering at least moderate increases over last month. Business is coming from such widely scattered sources as to indicate a solid foundation for the coming months when automotive requirements will be added to those already apparent. The lack of railroad buying is still the most important negative factor, but there is a growing belief among steel companies and equipment builders that a rising trend of carloadings would bring some of the railroads into the market for cars and locomotives.

Despite the recent action of Congress in refusing to approve a new spending-lending program, Government expenditures will be an important element in steel demand over the remainder of this year at least, and possibly well into 1940. The appropriations for national defense at the recent session, totaling nearly two billion dollars, are still in large part to be expended, while the PWA program will be only 70 per cent completed by the end of the year, with 100 per cent completion scheduled for June 30, 1940.

AN addition to the shipbuilding program is the award of five cargo boats by the Maritime Commission to the Tampa Shipbuilding & Engineering Co., Tampa, Fla., requiring 13,250 tons of steel. The Navy has awarded 8500 tons of plates to the Inland Steel Co.

The Carnegie-Illinois Steel Corp. will furnish 12,000 tons of galvanized sheets to a Kansas City fabricator for Government corn cribs.

The Northern Natural Gas Co., Omaha, Neb., has ordered 27,000 tons of pipe for a 250-mile line to run from Sioux City, Iowa, to Minneapolis. Three pipe makers shared the business.

Fabricated structural steel awards are light this week at less than 11,000 tons. New work in the market totals almost 17,000 tons.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Aug. 15, 1939	Aug. 8, 1939	July 18, 1939	Aug. 16, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.40	2.40	2.40	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.25	3.25	3.25	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$21.84
No. 2, Valley furnace	21.00	21.00	21.00	20.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	20.06
No. 2, Birmingham	17.38	17.38	17.38	16.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	20.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	21.34
Basic, Valley furnace	20.50	20.50	20.50	19.50
Malleable, Chicago†	21.00	21.00	21.00	20.00
Malleable, Valley	21.00	21.00	21.00	20.00
L. S. charcoal, Chicago	28.34	28.34	28.34	28.34
Ferromanganese, seab'd carlots	80.00	80.00	80.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	$16.25	*$16.125	$15.75	$15.25
Heavy melting steel, Phila.	16.25	16.25	15.75	14.25
Heavy melting steel, Ch'go.	13.875	13.875	13.625	13.75
Carwheels, Chicago	12.75	12.75	12.75	14.25
Carwheels, Philadelphia	16.25	16.25	16.00	17.25
No. 1 cast, Pittsburgh	15.75	15.25	15.25	15.25
No. 1 cast, Philadelphia	16.75	16.75	16.25	16.25
No. 1 cast, Ch'go (net ton)	12.75	12.75	12.75	13.25

*Corrected.

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$3.75
Foundry coke, prompt	4.75	4.75	4.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, Electrolytic, Conn.	10.50	10.50	10.25	10.125
Copper, Lake, New York	10.50	10.50	10.25	10.25
Tin (Straits), New York	‡8.75	48.80	48.60	42.875
Zinc, East St. Louis	4.75	4.75	4.50	4.75
Zinc, New York	5.14	5.14	4.89	5.14
Lead, St. Louis	4.90	4.90	4.70	4.75
Lead, New York	5.05	5.05	4.85	4.90
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Aug. 15, 1939	2.236c. a Lb	$20.61 a Gross Ton	$15.46 a Gross Ton
One week ago	2.236	20.61	15.42
One month ago	2.236	20.61	15.04
One year ago	2.300	19.61	14.41
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939	2.286c., Jan. 3	2.236c., May 16	.....	.....	$15.46, Aug. 15	$14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

PRICES

. . . Firming of quotations continues . . . Sheet sales gain at current levels

ALTHOUGH the total amount of fresh sheet orders at the current published price of 2c. a lb., basing points, is small in relation to the total amount of sheets being specified or shipped, nevertheless the amount of such orders in recent weeks has been somewhat beyond anticipations. There is no intimation of a general price advance for the fourth quarter but there are numerous signs of additional strengthening in the entire price structure with further elimination of past irregularities.

Of unusual interest in the Middle West this week is the news that 10,000 tons of a 12,000-ton galvanized sheet order went at the base price of 3.50c., the 2000 remaining tons receiving a lower quotation on the basis of a previous commitment. Carnegie-Illinois Steel Corp. took the business from the Butler Mfg. Co., Kansas City. Galvanized sheets have just lately strengthened after a long period of weakness. Sheet bars and plates are firm in the Chicago area.

It is still too early to comment on the results of the recent reinforcing bar price announcement as little new business has been placed since the new quotations took effect. That it will have a firming influence is generally conceded.

The tendency toward firmness in all prices continues at CLEVELAND and YOUNGSTOWN.

NEW BUSINESS

. . . Specifications at Pittsburgh running ahead of July

TOTAL steel specifications in the PITTSBURGH district so far this month are running somewhat ahead of the corresponding July period. Although part of this improved experience is attributable to the fact that the first few days in July were affected by holiday influences, thereby causing a much better comparative result for August, nevertheless, August business on a daily basis remains stronger than in July. In point of tonnage, structural specifications are leading, although hot rolled bar, sheets, and to some extent tubular goods, are relatively stronger than a month ago. The outstanding feature of current business continues to be the widely diversified list of consumers placing specifications.

The outstanding piece of new business in the Middle West last week went to Carnegie-Illinois Steel Corp. and consisted of 12,000 tons of galvanized sheets for ultimate fabrication into corn bins for the Government by Butler Mfg. Co., Kansas City. Additional orders for galvanized sheets totaling about the same tonnage will be seen shortly.

Sheet orders from automobile plants are being received in CHICAGO but the bulk of this business is still to come. Sellers emphasize their uncertainty as to just when these heavy releases are expected. It is regarded virtually as certain, however, that by this time next time, barring further Detroit labor trouble, sheet mills will be operating on much higher schedules. Inland Steel Co., bidding through its subsidiary, Joseph T. Ryerson & Son, Inc., received 8500 tons of plates from the Navy Department for shipment to Brooklyn and Philadelphia navy yards. This order is in addition to 1500 tons of bars awarded last week to Inland from the same source. Miscellaneous buying is still the most important single consumer classification in the Chicago market.

Pipeline orders and improved automotive demand have been providing the highlights at CLEVELAND and YOUNGSTOWN. Meanwhile, miscellaneous orders continue in good volume and are comparable on the daily basis with similar incoming business one month ago.

Total new bookings in PHILADELPHIA so far this month are below the level of the comparable period of July. While the decline is fairly general throughout the list of consuming channels, a large part of the loss is due to the absence of large shipyard releases which marked the first half of July. There have been several small purchases of steel by local auto parts makers, but no important releases of steel for the production of 1940 parts have yet been issued. Sheets, tin plate and construction steels are currently the most active, with merchant bars and tubular goods showing the contraseasonal gains in the past two weeks, although total business in these two lines, on a tonnage basis, is not very heavy.

The Bureau of Supplies and Accounts, Navy Department, will open bids on Aug. 24 for 1955 tons of medium plates, sheets, strips and bars and 243 tons of eye beams and special tee bars for two seaplanes under construction at the Puget Sound, Wash., navy yard.

The Bureau of Supplies and Accounts, Washington, will open bids on Aug. 24 for 11,405 tons of steel for two 45,000-ton battleships, under construction at the Philadelphia and Brooklyn Navy yards. The requirements are: 7500 tons of high tensile black plates, sheets and strips; 860 tons of high tensile galvanized plates, sheets and strips; 2350 tons of black medium shapes; 280 tons of galvanized medium plates; 375 tons of black high tensile sheets and 40 tons of galvanized high tensile sheets. The S. A. Healy Co., whose low bid on section S3 of the Chicago Subway was recently rejected, was the low bidder last week on section D1, which involves 17,800 tons of liner plates and rib beams, 2650 tons of reinforcing bars and 1850 tons of structural shapes. The bid was made in the name of the Healy Subway Construction Corp.

STEEL OPERATIONS

. . . Rate for industry up one and a half points to 62½%

STEEL ingot production continues its upward trend, having gained about a point and a half this week to 62½ per cent, equal to the high point of last year, the week of Nov. 15.

Output in the PITTSBURGH district has jumped four points this week to 57 per cent of capacity. This is the highest operating rate at PITTSBURGH since the week of Oct. 16, 1937, when the rate stood at 60 per cent. The PITTSBURGH rate would have been slightly higher had it not been for a last minute change on the down side in the schedule of one plant, due to temporary mechanical difficulties. This current rate is being supported by a

general run of miscellaneous business but a large part of the showing is attributable to substantial releases on structural tonnages awarded during the past few months. The WHEELING-WEIRTON district is up three points to 80 per cent.

CHICAGO district mills are operating at 58 per cent of capacity, up two points from last week. The open hearths at the CHICAGO district plant of Youngstown Sheet & Tube Co. are shut down for the second week and will remain so the remainder of the month.

The rate for Youngstown and nearby cities is down one point to 54 per cent. The CLEVELAND-LORAIN rate is up four points to 81 per cent.

The DETROIT ingot rate is 79.3 per cent, the increase being occasioned by the fact that Great Lakes Steel Corp. is operating 14 of its 16 furnaces while Ford Motor Co. continues to operate six out of 10. However, Ford Motor Co. will operate all of its furnaces beginning next Monday.

The addition of two open hearths to the active total in the SOUTHERN OHIO district pushes the average of ingot production in that area to 58 per cent. These two stacks were placed into operation at the end of the past week and will continue through the current week. Part of the improvement is for inventory purposes against anticipation of a shut down at the Portsmouth unit of the Wheeling Steel Corp. early in September to allow for repairs and vacation.

PIG IRON

. . . Shipments heavier at Cleveland and Chicago

GRADUALLY improving foundry operations, including acceleration in the automotive industry, are reflected in better shipments of both pig iron and foundry coke at CLEVELAND. The gain over July probably will be around 15 per cent on pig iron. Production of steel making iron continues at a high rate. PITTSBURGH sales and shipments are unchanged.

Shipments both of foundry coke and pig iron are running somewhat ahead of a month ago in CHICAGO. This is due largely to a combination of increased business from automobile sources and miscellaneou activities. CHICAGO pig iron sellers are anticipating good business throughout the fall months.

Melting schedules in the PHILADELPHIA area are holding to recent levels, but in the absence of any incentive to forward buying, current purchases are limited to one or two carlots for nearby delivery. Stock piles of merchant iron in producers' yards in eastern Pennsylvania are rather heavy and there is a possibility that one blast furnace may be taken out of blast soon. Operating schedules in the NEW YORK district have shown a slight improvement lately, especially in plants of machine tool parts suppliers and soil pipe makers, and releases against contracts have shown a corresponding gain. New buying, however, continues to be restricted to spot carlots.

The pig iron market in the SOUTHERN OHIO district continues to be featureless. Shipments against contracts continue at the July level but new orders are in small quantities. The melt is unchanged, although reported prospects in the automotive field indicates an early expansion of the melt from this source. Republic Steel blew out its Birmingham No. 2 furnace on Aug. 10 for relining, reducing the district's total to 14. The iron situation in the Birmingham area is reported more encouraging.

STRUCTURAL STEEL

. . . Heavy inquiries encourage Pittsburgh producers

AWARDS the past week were led by 2825 tons for the Water Street improvement, Pittsburgh, going to American Bridge Co., and 1200 tons for the Tasker housing project, Philadelphia, taken by Bethlehem Steel Co. Bethlehem Steel will fabricate 950 tons for the Cranston Heights viaduct New Castle County, Del.

Structural specifications at PITTSBURGH remain an important factor in the district operating rate. Orders are as heavy as last week and producers continue optimistic in view of the exceptionally large number of inquiries.

New business includes 4500 tons for NEW YORK subway, Sect. 6-B, route 110, 2200 tons for unit C of the Jersey City hospital building, and 1000 tons for a Sacramento, Cal., office building. Bids are in on 1000 tons for an Avondale, Pa., underpass. The St. Louis County Court, Clayton, Mo., plans to erect a bridge across the Mississippi River. It will be approximately 3640 ft. long and will cost about $3,500,000. Contemplated flood control work at Louisville, Ky., is expected to require about 2000 tons of steel sheet piling.

PLATES

. . . Navy requirements an important factor in market

JOSEPH T. RYERSON & SON, INC., bidding for the Inland Steel Co., has been awarded a blanket order by the Navy Department for 8500 tons of steel plates to be shipped to the Navy yards at Brooklyn and Philadelphia. Rolling of this order probably will not be schedued for another 30 days. The Chicago Bridge & Iron Co. has been awarded a contract for the construction of seven storage tanks for the Standard Oil Co. of Indiana, requiring 981 tons of plates.

Outside of Government purchases, there is very little activity in the EASTERN PENNSYLVANIA plate market. Fabricators and warehouses are well stocked at the current rate of demand and shipyards have not released any major tonnages in close to a month. There are still no signs of any railroad activity. Prices are much firmer than they have been at some time.

Demand at CLEVELAND is good and prices are a little firmer. Additional plate tonnage is likely to be coming out around Sept. 1 for feeders for the Toledo municipal intake line.

The Navy Department will take bids on Aug. 25 on requirements of battleships Iowa and New Jersey. Tonnages involved total close to 7000 tons of high tensile and medium plates, sheets and strip.

MERCHANT BARS

. . . Miscellaneous demand increasing . . . Slightly better auto orders

ALTHOUGH heavy automotive tonnages have not yet been placed, general miscellaneous bar demand at PITTSBURGH continues to maintain the pace set several weeks ago and in some cases satisfactory increases in the volume of business have materialized in the past week. Total hot rolled bar specifications so far this month are moderately ahead of the volume booked during the same time last month.

The month's orders to date at CLEVELAND are about even with the corresponding part of July. Demand continues highly diversified, with slightly larger movement to the automotive industry. Shipments are expected to hold up for some weeks.

Demand for bars in the CHICAGO area is still chiefly from miscellaneous sources. Farm implement and farm

tractor operations probably will attain a high level in late September or in October.

From ST. LOUIS it is reported that specifications have been coming in quite liberally against contracts placed before July 15, when new extras went into effect.

Demand in PHILADELPHIA has shown a modest improvement lately, with machine tool interests and warehouses most prominent in the new buying. There have been some small automobile releases from the automobile parts makers, but this material was for cleanup work on 1939 models.

SEMI-FINISHED STEEL

. . . Orders somewhat heavier, especially for sheet and tin bars

TOTAL semi-finished steel orders at PITTSBURGH so far this month are somewhat heavier than the volume placed during the corresponding July period. Fresh business booked in the past week has stepped up slightly, with major activity still centering on sheet and tin bars. Wire rods have been moving at a faster clip recently with indications of a further improvement in the near future.

Rerolling billets have been in good demand at CLEVELAND recently. Other semi-finished items are moving about the same as in other recent weeks. Non-integrated sheet makers are specifying steadily.

WIRE PRODUCTS

. . . Increased orders expected soon from automotive industry

THE improvement in manufacturers' wire demand noted at PITTSBURGH a few weeks ago, continues to hold, with every likelihood of further increases soon because of automotive demand. New merchant wire business, although relatively slow, has shown some small signs of improvement. Releases on previous merchant wire commitments are coming in at a fast clip.

Manufacturers' wire is in better demand at CLEVELAND, partly due to accelerated activity of the automotive industry. Orders for merchant wire continue light. Jobbers covered on many nail sizes before the recent price revision and not much replacement business can be expected in the immediate future.

BOLTS, NUTS AND RIVETS

. . . Business holding at July rate slightly better

AGGREGATE bolt and nut orders so far this month are quite closely comparable to the volume received during the corresponding part of July. Labor trouble in the automotive industry held back some releases. The tendency of all prices is toward firmness. Rivet manufacturers report both numerical volume and total tonnage improving, due to railroad and shipbuilding requirements. Cap screw manufacturers at CLEVELAND are enjoying a slightly better month than July, although not quite as good as June. Some new auto releases are in. However, the substantial gains shown by June, July and August this year in comparison to the same months last year arises mostly from miscellaneous business outside the automotive industry.

SHEETS AND STRIP

. . . 12,000 tons of galvanized material placed for corn cribs . . . Specifications gain

CARNEGIE-ILLINOIS STEEL Corp. has been awarded about 12,000 tons of galvanized sheets by the Butler Mfg. Co. of Kansas City. All but 2000 tons of this order was placed at the base price of 3.50c., the remaining tonnage being covered by a previous commitment. These sheets will be fabricated into corn bins which will be used for storage of surplus corn. About the same tonnage of galvanized sheets is yet to be placed but no information is now available as to its disposition.

Scattered releases from automobile plants are being received by CHICAGO sheet mills but the bulk of this demand is yet to come. Miscellaneous buying continues the major factor in that market. The sheet and tin mills at one CHICAGO district plant have scheduled 100 turns for the current week, an advance of 10 turns over last week and a new high rate for the year. The increase is accounted for by the hot strip mill, the sheet cold reduction will, the hot sheet mills and galvanizing shop. This rate is equal to about 78 per cent of normal operating capacity.

Sheet specifications at PITTSBURGH are running ahead of a month ago and in some instances record increases of as much as 20 per cent. The surprising feature of this condition is the fact that the excellent showing in demand is still without the normal support of the automobile industry. While automotive business has been improving slowly, the total volume of steel taken by this source has not been large. With releases from automobile and truck manufacturers expected to increase substantially by the end of this month, some producers look for a tighter delivery situation. The miscellaneous or general demand cannot be tacked down to major sources, owing to the wide diversification in orders being received daily by sheet producers.

Fair automotive releases and a slightly better movement of galvanized sheets are two of the principal developments at CLEVELAND. All types of consumers are represented in orders and releases being received. In many cases speedy shipments are urged.

In SOUTHERN OHIO sheet business is close to 70 per cent of capacity. There is virtually no inquiry for future deliveries, the bulk of current requests being for rush shipments. Consumers are said to be carrying relatively no inventories, the present rate of operations indicating current consumption.

While activity of users is little changed from a month ago, the volume of releases in PHILADELPHIA has eased off slightly in the past two weeks. One bright spot, however, is stove makers who continue to specify regularly. There have been a number of sales recently at the full published prices. Sellers are still actively endeavoring to obtain releases on low price material and while some have been fairly successful in this respect, others still have substantial unshipped tonnages on their books.

REINFORCING BARS

. . . Distributers cover for jobs bid prior to Aug. 10

FAIRLY substantial coverages were made by reinforcing bar distributers last week on jobs on which bids had been submitted up to and including Aug. 10. On such jobs the mills covered the distributers at a base price of 1.60c. a lb.

The new setup on prices, announced in part last week, provides for quotations to distributers of 1.70c. a lb., basing point, on new billet bars when ordered in lots of 20 tons or more of one size, one grade and in lengths of 30 ft. or more. Rail steel makers have

adopted, for the time being at least, the same quantity setup with a price of 1.65c. a lb., basing points. The price to contractors, as announced a week ago, is 1.90c. a lb., basing points

The Bethlehem Steel Co. was awarded 850 tons for the Tasker housing project in PHILADELPHIA and 800 tons for the Paedegat Basin bridge in NEW YORK. Bids on the general contracts are in on a water intake at Toledo, requiring 2000 tons, and a CLEVELAND municipal lighting plant, calling for 1240 tons. A municipal hospital in PITTSBURGH will take 1000 tons. A considerable tonnage of bars is pending in CHICAGO, including three sections for the new subway totaling around 9000 tons. Other jobs in that district being figures aggregate about 5000 tons.

An award by the Navy Department of the first portion of a large scale program of Pacific Coast fortifications was made to the Hawaiian Dredging Co., Honolulu. Raymond Concrete Pile Co. and Turner Construction Co., New York, at cost plus a fixed fee of $898,000 for development of aviation facilities at Oahu, Hawaii; Midway Island; Johnston Island; Palmyra Island and Pearl Harbor, Hawaii.

SHIPBUILDING

. . . Tampa company gets award of five cargo boats

THE Tampa (Fla.) Shipbuilding & Engineering Co., Tampa, Fla., has been awarded a $9,072,150 contract by the Maritime Commission for the construction of five C-1 steel cargo vessels to require a total of 13,250 tons of steel. The contract calls for delivery on the first of the ships in 15 months, with the others to be delivered about two months apart.

The commission opened bids on July 11 for the ships which are to be of full scantling type and steam propelled. The latest award brings the total of new ships ordered by the commission to 75. Sixteen ships have been launched under the commission's program, including six tankers, nine C-2 dry cargo ships and one constructed for a private operator.

RAILROAD BUYING

. . . Equipment trade hopeful for improvement in purchases

ALTHOUGH the volume of inquiries for railroad cars and locomotives now in the market is not large, equipment builders are hopeful that a larger amount of business will develop during the fall. Railroad men agree that some equipment buying will eventuate if carloadings increase sufficiently to tax present serviceable facilities.

The New York Board of Transportation, which has been in the market for 150 cars for the Independent subway, has increased its inquiry to 300. Other inquiries include 35 automobile cars for Minneapolis & St. Louis, 49 ore cars for Tennessee Coal, Iron & Railroad Co., and a gasoline or diesel locomotive for Southern New York Railway.

American Refrigerator Transit Co. will build 100 refrigerator cars in its St. Louis shops.

New York, Chicago & St. Louis has placed an order for 25 covered hopper cars with American Car & Foundry Co.

The St. Louis Public Service Co. has been authorized to buy 100 street cars at a cost of $1,650,000, which will be built by the St. Louis Car Co. Under the plan of reorganization in Federal Court the Public Service Co. agree to spend $5,600,000 for improvements over the next four-year period.

TIN PLATE

. . . Operations off slightly . . . Some pressure for a lower price

TIN plate operations this week have eased off a point to 68 per cent. With can makers ordering only absolute requirements, minor fluctuations either way may be anticipated. The heavy bulk of present business is for sanitary cans but the slight improvement in general business conditions throughout the country has been reflected in better general line can tin plate demand.

Price announcement for the fourth quarter is expected by the end of this month. Some pressure is being exerted upon tin plate makers for a reduction of at least 25c. per base box.

TUBULAR GOODS

. . . Northern Natural Gas Co. buys 27,000 tons for line

OIL country goods specifications, although not showing any marked improvement in the past few weeks, are, nevertheless, more numerous than a month ago. Consumers' stocks are understood to be at a low point which has resulted in hand-to-mouth buying for prompt shipment.

Northern Natural Gas Co., Omaha, Neb., recently purchased approximately 27,000 tons of 16-in. line pipe for a 250-mile line to run from a point near Sioux City, Iowa, to Minneapolis. The order was divided among National Tube Co., Republic Steel Corp., and Youngstown Sheet & Tube Co.

Standard Oil Co. of Ohio has three projects involving line pipe under way. The oil company split its total tonnages between Republic Steel Corp. and National Tube Co. Now being built is a 24-mile, 6-in. line from the new pool at Griffin, Ind., to Mount Vernon, Ind. A 6-in. gasoline line will be laid from Springfield to Dayton, Ohio, a distance of 24 miles. A 10-in. line 120 miles long will be built from the terminus of Standard's recently acquired Tidewater line at Stoi, Ill., to Salem, Ill., tapping the Salem pool.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Aug. 15, 1939	Aug. 8, 1939	July 18, 1939	Aug. 16, 1938	1939	1938
Fabricated structural steel awards	10,745	19,505	19,150	10,500	636,125	437,025
Fabricated plate awards	1,105	8,050	355	5,120	108,490	89,990
Steel sheet piling awards	815	700	300	275	43,840	28,585
Reinforcing bar awards	4,055	5,395	7,220	4,415	300,150	188,270
Total Letting of Construction Steel..	16,720	38,000	27,960	20,310	1,088,605	743,870

IRON AND STEEL SCRAP

. . . Prices are strong in most markets . . . Pittsburgh up slightly . . . Composite quotation at new high.

AUG. 15—Scrap markets continue strong. The only sign of an easier tendency anywhere is in the Cleveland and Youngstown areas, where scrap is a little more plentiful than it has been, but prices are unchanged. Restrictions are in force at two points in the Youngstown district because shipments have been coming in more freely than they can be handled.

The only change in price affecting THE IRON AGE scrap composite is at Pittsburgh, where the range on No. 1 heavy melting steel has been narrowed to $16 to $16.50, making the average there 12½c. higher and bringing the composite price up 4c. to $15.46, a new high for this year. There has been considerable strength at St. Louis, where some items are up 50c. and one advanced $1.

In the East exporters are having difficulty in obtaining enough scrap to load boats. The export influence is fully as important as the advancing steel ingot production rate. Both working together promise a continuance of firm prices for the near future at least.

Pittsburgh

The market remains strong with supplies none too plentiful and with brokers still vying with each other in attempting to purchase material at current quotations. Small tonnages of No. 1 heavy melting steel have been sold into consumption within the past few days at $16 and $16.50 a ton. Meanwhile, brokers in the majority of cases are paying $16 for No. 1 steel and in some exceptional circumstances close to $16.50. Railroad and low phos. specialties are definitely higher on the recent consumption sales. No. 1 heavy melting steel is quotable this week at $16 to $16.50, up 12½c. from last week's average. Short shoveling turnings have become strong on the basis of a moderate sale into consumption at $13.50 a ton. A $1 spread is used to cover this grade this week as other points have bought recently at less than this figure.

Chicago

Practically no change is evident in this market from last week. Heavy melting steel continues to be quoted at $13.75 to $14. Brokers generally are able to fill their needs at $13.75 from dealers but $14 would have to be paid for larger tonnages. The leading buyer reports $14 as his top price. Out-of-town dealers are said to have speculative stocks on hand.

Philadelphia

Pricewise, the market here is unchanged, but technically it may be said to be somewhat firmer. This latter development is due largely to the growing tightness of available supplies. While this situation has not yet reached the point where shipments to domestic mills have been affected, it has considerably slowed down export loadings. With both Boston and New York concentrating on export business, normal sources of supplies are shut off and prices are not yet high enough to attract material from the South. There is no boat at Port Richmond at present, the next one being due on the 20th. There have been no new sales of No. 1 steel lately, but the current price of $16 to $16.50 appears firmly entrenched from the brokers' viewpoint. Demand for cast grades is rather active from both mill and foundry with brokers paying up to $13 on certain lots of stove plate. Heavy breakable is strong at $16.

Buffalo

The market is coasting this week. There have been no large sales. Shipments are moving freely and sentiment among dealers is strong. Short steel rails are up 50c. a ton this week to $18.50-$19. With increased operations holding scrap is being consumed at a good rate by local mills.

Cleveland

Blast furnace grades continue in the spotlight here. Another purchase has been made in addition to the one reported last week, and mixed borings and turnings are up another 25c. to a range of $8.50 to $9. Shipments are going forward briskly. Scrap does not appear quite as scarce as a few weeks ago, partly due to better stamping plant operations. Heavy melting quotations are unchanged.

Youngstown

Material has been coming out fast here, so plentifully that restrictions are in force at two Valleys points. Prices at the start of this week are unchanged in the absence of new purchases, but with mill operations holding up well, additional buying would not be surprising.

St. Louis

The scrap iron market is stronger and higher. There is a heavy short interest by dealers as a result of a recent sale, and they have advanced prices to bring the material out. Then, too, a leading district melter is expected to come into the market some time this week. Selected heavy melting, Nos. 1 and 2 heavy melting, No. 1 locomotive tires, railroad springs, No. 2 railroad wrought, steel angle bars and railroad malleable are 50c. a ton higher and rails for rolling are $1 higher. Railroad lists: Louisville & Nashville, 6700 tons; Southern, 4250 tons; Chicago & Eastern Illinois, 1000 tons.

Cincinnati

Although the local scrap market continues to have a strong undertone, dealers bids are unchanged. Changes in prices in other areas are attributed to the influence of export business, which, of course, does not affect this area. Sales of small tonnages during the past week have been reported, but no large bookings are reported. Movement against contracts is a trifle heavier as a result of the renewal of operations at the Middletown unit of the American Rolling Mill Co. and the addition of two more open hearths in two other places.

Detroit

Prices are unchanged in Detroit. However, a sharp increase in the ingot rate in the Detroit area was regarded by some as a forerunner of a stiffening force.

Boston

The firming of the Pittsburgh market for No. 1 heavy melting steel has had a sentimental influence on the local market for other materials, but in only one instance have prices advanced. Steel turnings are higher with the bulk of carlot shipments going to eastern Pennsylvania. The American Steel & Wire Co., Worcester, is reported to be buying No. 1 steel in western Massachusetts at $13.25 to $13.75 a ton, delivered. The Washburn Wire Co., Phillipsdale, R. I., has given some shipping instructions on old orders, but is not buying, using its billet crops instead. Comparatively little bundled skeleton is moving to domestic consumers because compressors are dealing with exporters. The export market continues active, very firm and unchanged in price.

New York

Following the mark-up of some prices last week, there have been no further changes in this market, but the price situation is strong, based on a better domestic demand together with continued loadings of scrap for export.

Toronto

Trading in iron and steel scrap is spotty with some indications of improvement for the early future. Large consumers still are holding contracts to 30-day periods and are not advancing bid prices, but the fact that scrap offerings have slowed down considerably since the last cut in dealers' buying prices, may tend to stiffen prices if dealers are to continue meeting demands of consumers. Some dealers appear rather anxious to put up prices, but state that this cannot be successfully accomplished and give them a profit on transactions unless consumers will pay more for scrap. At the present time Canadian prices mostly are well below those quoted in many centers of the United States, but there is little or no demand for Canadian scrap in the American market at the moment. So far this year only a few dealers report shipments of scrap across the international boundary.

Harry Moses Chairman Of Mine Congress Group

WASHINGTON—Harry M. Moses, president, H. C. Fricke Coke Co., Pittsburgh, has accepted the national chairmanship of the program committee for the seventeenth annual coal convention and exposition of the American Mining Congress, Julian D. Conover, secretary of the congress, announces. Final selection of the site for the 1940 meeting has not yet been made, but is expected shortly. The meeting will probably be held during the last week in April or the first week in May, 1940.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.00 to	16.50
Railroad hvy. mltng...	17.00 to	17.50
No. 2 hvy. mltng. steel.	14.00 to	14.50
Scrap rails	16.50 to	17.00
Rails 3 ft. and under..	18.50 to	19.00
Comp. sheet steel	16.00 to	16.50
Hand bundled sheets..	15.00 to	15.50
Hvy. steel axle turn..	14.50 to	15.00
Machine shop turn....	10.00 to	10.50
Short shov. turn.....	12.50 to	13.50
Mixed bor. & turn....	9.00 to	9.75
Cast iron borings.....	9.00 to	9.75
Cast iron carwheels...	15.50 to	16.00
Hvy. breakable cast...	13.00 to	13.50
No. 1 cupola cast.....	15.50 to	16.00
RR. knuckles & cplrs.	18.50 to	19.00
Rail coil springs	20.00 to	20.50
Rail leaf spring	19.00 to	19.50
Rolled steel wheels....	19.00 to	19.50
Low phos. billet crops.	20.00 to	20.50
Low phos. punchings..	18.50 to	19.00
Low phos. plate (heavy)	18.50 to	19.00
Railroad malleable ...	16.50 to	17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.00 to	$16.50
No. 2 hvy. mltng. steel.	14.00 to	14.50
Hydraulic bund., new .	16.00 to	16.50
Hydraulic bund., old..	12.50 to	13.00
Steel rails for rolling.	17.00 to	17.50
Cast iron carwheels...	16.00 to	16.50
Hvy. breakable cast...	....	16.00
No. 1 cast	16.50 to	17.00
Stove plate (steel wks.)	13.00 to	13.50
Railroad malleable ...	16.00 to	17.00
Machine shop turn....	9.00 to	9.50
No. 1 blast furnace....	6.50 to	7.00
Cast borings	6.50 to	7.00
Heavy axle turnings..	10.50 to	11.00
No. 1 low phos. hvy...	17.50 to	18.00
Couplers & knuckles..	17.50 to	18.00
Rolled steel wheels....	17.50 to	18.00
Steel axles	20.00 to	20.50
Shafting	20.50 to	21.00
Spec. iron & steel pipe	13.00 to	13.50
No. 1 forge fire.....	12.00 to	12.50
Cast boring (chem.)..	9.50 to	10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$13.75 to	$14.00
Auto. hvy. mltng. steel alloy free	12.50 to	13.00
No. 2 auto steel	11.00 to	11.50
Shoveling steel	13.75 to	14.00
Factory bundles	12.75 to	13.25
Dealers' bundles	11.75 to	12.25
Drop forge flashings...	10.00 to	10.50
No. 1 busheling	12.50 to	13.00
No. 2 busheling, old...	5.75 to	6.25
Rolled carwheels	14.50 to	15.00
Railroad tires, cut ...	15.00 to	15.50
Railroad leaf springs..	14.50 to	15.00
Steel coup. & knuckles	14.50 to	15.00
Axle turnings	12.50 to	13.00
Coil springs	16.50 to	17.00
Axle turn. (elec.).....	13.50 to	14.00
Low phos. punchings..	15.50 to	16.00
Low phos. plates 12 in. and under	15.00 to	15.50
Cast iron borings	6.50 to	7.00
Short shov. turn.....	6.50 to	7.00
Machine shop turn....	6.50 to	7.00
Rerolling rails	18.00 to	18.50
Steel rails under 3 ft..	16.00 to	16.50
Steel rails under 2 ft..	16.50 to	17.00
Angle bars, steel	15.50 to	16.00
Cast iron carwheels ..	12.50 to	13.00
Railroad malleable	15.00 to	15.50
Agric. malleable	12.00 to	12.50

	Per Net Ton	
Iron car axles	$18.00 to	$18.50
Steel car axles	17.50 to	18.00
Locomotive tires	13.00 to	13.50
Pipes and flues	8.50 to	9.00
No. 1 machinery cast.	12.00 to	12.50
Clean auto. cast	12.50 to	13.00
No. 1 railroad cast....	11.00 to	11.50
No. 1 agric. cast	10.00 to	10.50
Stove plate	7.75 to	8.25
Grate bars	7.75 to	8.25
Brake shoes	9.50 to	10.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.25 to	$15.75
No. 2 hvy. mltng. steel.	14.25 to	14.75
Low phos. plate	16.50 to	17.00
No. 1 busheling	14.25 to	14.75
Hydraulic bundles	14.75 to	15.25
Machine shop turn....	9.00 to	9.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.50 to	$15.00
No. 2 hvy. mltng. steel.	13.50 to	14.00
Comp. sheet steel	14.25 to	14.75
Light bund. stampings	11.00 to	11.50
Drop forge flashings..	11.50 to	12.00
Machine shop turn....	7.50 to	8.00
Short shov. turn.	8.00 to	8.50
No. 1 busheling	13.50 to	14.00
Steel axle turnings....	10.50 to	11.00
Low phos. billet and bloom crops	18.50 to	19.00
Cast iron borings	8.50 to	9.00
Mixed bor. & turn.....	8.50 to	9.00
No. 2 busheling	8.50 to	9.00
No. 1 cupola cast	15.50 to	16.00
Railroad grate bars...	11.00 to	11.50
Stove plate	9.00 to	9.50
Rails under 3 ft.	17.75 to	18.25
Rails for rolling	18.25 to	18.75
Railroad malleable ...	15.50 to	16.00
Cast iron carwheels ..	14.00 to	14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.50 to	$15.00
No. 2 hvy. mltng. steel.	12.50 to	13.00
Scrap rails	15.50 to	16.00
New hvy. b'ndled sheets	13.00 to	13.50
Old hydraul. bundles.	11.50 to	12.00
Drop forge flashings...	12.50 to	13.00
No. 1 busheling	12.50 to	13.00
Machine shop turn.....	6.00 to	6.50
Knuckles & couplers..	15.00 to	15.50
Coil & leaf springs....	15.00 to	15.50
Rolled steel wheels....	15.00 to	15.50
Shov. turnings	7.00 to	7.50
Mixed bor. & turn....	7.00 to	7.50
Cast iron borings	7.00 to	7.50
No. 1 machinery cast..	15.00 to	16.00
No. 1 cupola cast.	14.50 to	15.00
Stove plate	13.00 to	13.50
Steel rails under 3 ft..	18.50 to	19.00
Cast iron carwheels...	13.50 to	14.00
Railroad malleable	15.00 to	15.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$12.50 to	$13.00
No. 1 hvy. melting....	12.25 to	12.75
No. 2 hvy. melting....	11.75 to	12.25
No. 1 locomotive tires.	12.75 to	13.25
Misc. stand. sec. rails.	14.00 to	14.50
Railroad springs	14.50 to	15.00
Bundled sheets	7.00 to	7.50
No. 1 busheling	7.50 to	8.00
Cast. bor. & turn.....	2.50 to	3.00
Machine shop turn....	4.50 to	5.00
Heavy turnings	9.00 to	9.50
Rails for rolling	17.00 to	17.50
Steel car axles	17.00 to	17.50
No. 1 RR. wrought....	9.75 to	10.25
No. 2 RR. wrought....	12.50 to	13.00
Steel rails under 3 ft..	16.00 to	16.50
Steel angle bars	13.50 to	14.00
Cast iron carwheels...	14.75 to	15.25
No. 1 machinery cast..	14.50 to	15.00
Railroad malleable	12.50 to	13.00
No. 1 railroad cast....	12.50 to	13.00
Stove plate	7.50 to	8.00
Grate bars	8.50 to	9.00
Brake shoes	9.50 to	10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$11.50 to	$12.00
No. 2 hvy. mltng. steel.	9.25 to	9.75
Scrap rails for mltng.	15.00 to	15.50
Loose sheet clippings.	7.00 to	7.50
Hydrau. b'ndled sheets	11.00 to	11.50
Cast iron borings	3.50 to	4.00
Machine shop turn....	4.75 to	5.25
No. 1 busheling	7.50 to	8.00
No. 2 busheling	2.50 to	3.00
Rails for rolling	17.00 to	17.50
No. 1 locomotive tires.	13.50 to	14.00
Short rails	17.75 to	18.25
Cast iron carwheels...	12.75 to	13.25
No. 1 machinery cast.	12.75 to	13.25
No. 1 railroad cast....	12.50 to	13.00
Burnt cast	6.75 to	7.25
Stove plate	6.75 to	7.25
Agricul. malleable	11.00 to	11.50
Railroad malleable	13.50 to	14.00
Mixed hvy. cast	11.25 to	11.75

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	....	$13.00
Scrap steel rails	$13.50 to	14.00
Short shov. turnings..	....	7.50
Stove plate	....	9.50
Steel axles	....	18.50
Iron axles	....	18.50
No. 1 RR. wrought.....	....	10.00
Rails for rolling	16.00 to	16.50
No. 1 cast.	....	15.00
Tramcar wheels	14.50 to	15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. in-trial steel	$11.00 to	$11.50
No. 2 hvy. mltng. steel.	10.00 to	10.50
Borings and Turnings.	5.75 to	6.25
Long turnings	5.75 to	6.75
Short shov. turnings..	6.50 to	7.00
No. 1 machinery cast..	13.00 to	13.50
Automotive cast	13.50 to	14.00
Hvy. breakable cast...	9.50 to	10.00
Stove plate	8.00 to	8.50
Hydraul. comp. sheets.	12.50 to	13.00
New factory bushel....	11.00 to	11.50
Sheet clippings	8.25 to	9.25
Flashings	10.50 to	11.00
Low phos. plate scrap.	12.00 to	12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$11.50 to	$12.00
No. 2 hvy. mltng. steel.	9.00 to	9.50
Hvy. breakable cast...	11.50 to	12.00
No. 1 machinery cast.	11.50 to	12.00
No. 2 cast	9.50 to	10.00
Stove plate	9.50 to	10.00
Steel car axles	15.00 to	15.50
Shafting	15.00 to	15.50
No. 1 RR. wrought....	11.00 to	11.50
No. 1 wrought long....	9.50 to	10.00
Spec. iron & steel pipe	9.00 to	9.50
Rails for rolling	16.00 to	16.50
Clean steel turnings*..	4.50 to	5.00
Cast borings*	3.50 to	4.00
No. 1 blast furnace....	3.50 to	4.00
Cast borings (chem.)..	9.50 to	10.00
Unprepared yard scrap	6.00 to	6.50
Light iron	3.00 to	3.50
Per gross ton, delivered local foundries:		
No. 1 machn. cast†....	$13.50 to	$14.00
No. 2 cast†	10.50 to	11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$10.25 to	$10.50
Machine shop turn.....	....	4.65
Mixed bor. & turn.....	2.00 to	2.25
Bun. skeleton long	....	8.15
Shafting	16.00 to	16.15
Cast bor. chemical....	5.00 to	6.00
Per gross ton delivered consumers' yards:		
Textile cast .....*.....	$14.00 to	$14.50
No. 1 machine cast....	13.50 to	14.50
Per gross ton delivered dealers' yards:		
No. 1 hvy. mltng. steel.	$12.00 to	$12.50
No. 2 steel	10.50 to	11.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to	$13.50
No. 2 hvy. mltng. steel.	12.50 to	13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$9.25	$8.75
No. 2 hvy. mltng. steel.	8.00	7.50
Mixed dealers steel....	6.75	6.25
Drop forge flashings...	8.25	7.75
New loose clippings...	4.25	3.75
Busheling	3.75	3.25
Scrap pipe	4.25	3.75
Steel turnings	4.25	3.75
Cast borings	3.75	3.25
Machinery cast	14.00	13.50
Dealers cast	12.00	11.50
Stove plate	8.00	7.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$12.50 to	$13.00
No. 2 hvy. mltng. steel.	11.00 to	11.50
No. 2 cast	10.50 to	11.00
Stove plate	9.50 to	10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$14.00 to	$14.25
No. 2 hvy. mltng. steel.		13.00
Rails (scrap)	14.00 to	14.25

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel.	$15.00 to	$15.25
No. 2 hvy. mltng. steel.	13.50 to	13.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.00c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c.
Detroit, delivered	2.00c.
On cars dock Tex. Gulf ports	2.25c.
On cars dock Pacific ports	2.35c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.80c.
Detroit, delivered	1.90c.
On cars dock Tex. Gulf ports	2.15c.
On cars dock Pacific ports	2.25c.

IRON BARS

Chicago and Terra Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.*
Philadelphia, del'd	2.05c. to 2.15c.
New York, del'd	2.19c. to 2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

* Subject to concessions, particularly in the East, of $2 a ton.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.00c.
Detroit, delivered	2.10c.
Philadelphia, delivered	2.17c.
Granite City	2.10c.
On cars dock Pacific ports	2.50c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from $4 to $8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.00c.
Detroit, delivered	2.10c.

Cooperage Stock

Pittsburgh & Chicago	2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from $4 to $8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to $4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.40
Coated nails	2.40
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.90
Galvanized fence wire	3.30
Polished staples	3.10
Galvanized staples	3.35
Twisted barbless wire	3.25
Woven wire fence, base column	67
Single loop bale ties, base col	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool	$2.58
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool	$2.76

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	56	36	¼ & ⅜	+9	+30
¼ to ⅜	59	43½	½	24	6½
½	63½	54	¾	30	13
¾	66½	60½	1 & 1¼	34	19
1 to 3	68½	60½	1½	38	21½
			2	37½	21

Lap Weld

2	61	52½	2	30½	15
2½ & 3	64	55½	2½ to 3½	31½	17½
3½ to 6.66		57½	4	33½	21
7 & 8.65		55½	4½ to 8.32	½	20
9 & 10.64	½	55	9 to 12	28½	15
11 & 12.63	½	54			

Butt weld, extra strong, plain ends

⅛	54½	41½	¼ & ⅜	+10	+43
½ to ⅜	56½	45½	½	25	9
½	61½	37½	¾	31	15
¾	65½	57½	1 to 2	38	22½
1 to 3	67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	33½	18½
2½ & 3	63	55½	2½ to 4.39	½	25½
3½ to 6.66	½	59	4½ to 6.37	½	24
7 & 8.65	½	56	7 & 8	38½	24½
9 & 10.64	½	55	9 to 12	32	20½
11 & 12.63	½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
1 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2½ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra
4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $5 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 12½
Stove bolts in bulk	84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

Base Per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham 65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¾ in. and smaller	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	75
Upset set screws, cup and oval points	77½
Milled studs	60

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.ob. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot stp.	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s.
Steel bars, open hearth	£10 8s.
Beams, open hearth	£10
Channels, open hearth	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheet ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa. Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	24.50 base
Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered: Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 13%, 50c. a ton is added. Above 12% add 75c. a ton

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$83.00
2.50% carbon	88.00
2% carbon	93.00
1% carbon	103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12c
Iron, basic or foundry, Swedish, aver. 65% iron	10½c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	29c
Man., African, Indian, 44-48%	25c
Man., African, Indian, 49-51%	30c.
Man., Brazilian, 46 to 48%	27c

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$18.00
Tungsten, domestic, scheelite delivered	$16.00 to $17.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	22.00
Turkish, 48-49%	22.50
Turkish, 45-56%	19.50
Turkish, 40-41%	17.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	23.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$16.00 to $17.00
Domestic, f.o.b. Ohio River landing barges	$16.50 to 17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	$17.00 to 18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal

No. 2, f.o.b. Bayonne, N. J.	4.00c.
No. 6, f.o.b. Bayonne, N. J.	2.50c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c
No. 3 distillate, del'd Cleve'd.	5.50c
No. 4 industrial, del'd Cleve'd.	5.25c
No. 5 industrial, del'd Cleve'd.	3.75c
No. 6 industrial, del'd Cleve'd.	3.50c

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Furnace, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by - product Chicago ovens	10.25
Foundry, by - product, del'd New England	12.50
Foundry, by - product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by - product, Philadelphia	10.95
Foundry, by - product, delivered Cleveland	10.30
Foundry, by - product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by - product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

Formed Metal Plumbing Ware Group Organized

A NEW trade group has been recently organized in the plumbing ware field as the result of a meeting in Cleveland of the manufacturers of sheet iron and steel plumbing fixtures finished with porcelain enamel. The organization will be known as the Formed Metal Plumbing Ware Association and will have offices at 612 North Michigan Avenue, Chicago, and at 602 Southern Building, Washington.

At the Cleveland meeting the following companies that produce this type of ware were represented: Alliance Enameling Co., the plumbing ware division of Briggs Mfg. Co., Central Mfg. Co., Davidson Enamel Products Co. of Indiana, Enamel Products Co., General Porcelain Enameling & Mfg. Co., Ingram-Richardson Mfg. Co. of Indiana, and the Youngstown Pressed Steel division of Mullins Mfg. Co. Manufacturers of iron and steel and of porcelain enamel frit who will be associated with the group in its cooperative effort include: American Rolling Mill Co., Carnegie-Illinois Steel Corp., Chicago Vitreous Enamel Product Co., Ferro Enamel Corp., Great Lakes Steel Corp., O. Hommel Co., Porcelain Enamel & Mfg. Co., Republic Steel Corp., and Youngstown Sheet & Tube Co.

Mike Tighe Sees End for CIO, AFL Unless Feud Is Dropped

PITTSBURGH—"Unless the two warring factions in the CIO and the AFL end their conflict, it is doubtful whether either of them will survive," M. F. (Mike) Tighe, retired president of the Amalgamated Association of Iron, Steel & Tin Workers, said this week as he and his wife celebrated their 60th anniversary. Amid the reading of congratulatory messages, Mike took time out to say that unless the CIO-AFL feud ceases, it will remain for the labor rank and file to organize its own third group.

Friends to Honor Tom Moses, 70

PITTSBURGH—Close to 200 friends from the U. S. Steel Corp. of Delaware and subsidiary coal companies will gather at the William Penn Hotel Aug. 18 to celebrate the 70th birthday of genial Tom Moses, vice-president of raw materials, U. S. Steel Corp. of Delaware. Mr. Moses is well known through the steel and coal industries and before becoming vice-president of the Delaware corporation was president of the H. C. Frick Coke Co., leading U. S. Steel coal subsidiary. He has served the U. S. Steel Corp. and its subsidiaries for the past 50 years.

NLRB Orders Bargaining For G-M Apprentices

WASHINGTON—If the National Labor Relations Board continues to follow the precedent laid down in a ruling affecting the Hyatt Bearings Division of General Motor Corp., Harrison, N. J., apprentices receiving industrial training in the automobile industry will be included with regular employees for collective bargaining purposes.

Rejecting the contention of the company that the apprentices are students and not employees, the board ordered a collective bargaining election for hourly-paid workers to include 50 apprentices and added:

"The apprentices who attend a special school, but who also do a certain amount of work, are brought into close touch with other hourly employees and they should be included within the appropriate (union) unit."

Safety Award for Mackintosh-Hemphill

PITTSBURGH—Mackintosh-Hemphill Co. has been awarded the president's trophy of the Pennsylvania Manufacturers' Association for outstanding achievement in the advancement of safety during the past year. The company's Midland, Pa., plant has operated almost at capacity from June 27, 1938, to date without a disabling accident.

Spectrochemical Analysis

THE article "Spectrochemical Analysis," published in the July 27 issue, contained the statement, "the elements which play havoc with zinc-base die casting metal and the limiting amounts of those elements are lead 0.007 per cent, tin 0.005 per cent, cadmium 0.005 per cent, and magnesium between 0.02 and 0.10 per cent."

The latter part of this statement has been misconstrued as meaning that within the limits mentioned magnesium has a deleterious effect. The author, K. J. Mackenzie, of International Business Machines Corp., has written to state that such a meaning is incorrect; the specification means that there shall be at least 0.02 per cent magnesium present and not more than 0.10 per cent.

TRADE NOTES

The Inland Steel Co. announces the issuance of licenses for the manufacture of Ledloy, to the Heppenstall Co., Pittsburgh, and to American Rolling Mill Co., Middletown, Ohio.

Atlas Press Co., Kalamazoo, Mich., has built a plant addition which provides new working area of 17,000 sq. ft. The added floor space steps up manufacture of the company's lathes, shapers, drill presses, and arbor presses. An addition of approximately the same size was completed in November, 1937.

Keystone Machine & Pump Co., Rankin, Pa., is now in its new plant at 25 Hamilton Street.

Service on all UCC Combustible Gas Indicators, manufactured by the Linde Air Products Co., now in use, will hereafter be maintained by the Davis Emergency Equipment Co., 55 Van Dam Street, New York, according to an announcement made by F. R. Davis, president of the Davis company.

Lea Mfg. Co., Waterbury, Conn., has made an arrangement with United Chromium, Inc., for the use of Unichrome Rack Coating-W to insulate plating racks. Unichrome Rack Coating-W is a white insulating material which has properties of resistance to plating and cleaning solutions.

Hanson-Van Winkle-Munning Co., Matawan, N. J., has appointed Carl F. Miller & Co., Inc., 1033 Sixth Avenue South, Seattle, distributer for the State of Washington.

FINANCIAL NOTES

Rustless Iron & Steel Corp.'s preferred stockholders have voted to authorize directors to negotiate a loan of $1,750,000, of which $1,300,000 will be required for plant additions, $250,000 for bank loans maturing this year and $200,000 for additional working capital.

Allegheny Ludlum Steel Corp., Pittsburgh, reports net profit of $147,740 before payment of preferred dividends, for the quarter ended June 30, compared with net loss of $561,932 in the same period of 1938.

United Engineering & Foundry Co., Pittsburgh, reports net income of $951,813 for the six months ended June 30, equal, after all charges, to $1.12 per share on outstanding common stock. This compares with net income of $1,402,998 for the similar 1938 period, equivalent to $1.68 per share.

Armco's Hot Strip Mill Resumes Production

THE hot strip mill of American Rolling Mill Co.'s East works plant, Middletown, Ohio, is again operating. The plant was closed July 3 to permit construction of a new slabbing mill replacing an obsolete blooming mill built in 1910, and the revamping of the hot strip mill. Cost of the improvement was estimated by Armco officials at $4,500,000, the final step in the improvement program at this plant, authorized by the stockholders in 1937. The majority of the 1200 construction workers were Armco men from departments affected by the shut-down.

Latest Offerings in Finishing Equipment and Metal Finishes

(CONCLUDED FROM PAGE 57)

The resin belongs in the class of a phenol modified, oil extended alkyd, but the procedure used in its manufacture has been reversed from usual practice. A phenolic varnish base is made first, which is afterwards converted into an alkyd by the addition of phthalic anhydride. The resin may then be dissolved in suitable solvents to make the wrinkle varnish or it may be blown with air and afterwards dissolved to make a varnish with a more accentuated wrinkling texture. The method involved offers particular advantage in allowing appreciable time to elapse between the spraying and baking operations. Also, with a proper selection of the phenol gum used, the time of baking can be shortened materially.

Porcelain Enamel Finish

A NEW one-coat, one-fire brown porcelain enamel finish has been announced by the *Porcelain Enamel & Mfg. Co.*, Baltimore. After drying, the brown coat may be grained in the bisque and fired at one time. It is said to be especially desirable where lighter gage metals are used, as the firing temperature is much lower than in ordinary practice. It covers uniformly and has a good glossy finish.

LAPP Ware is the trade name of a new porcelain enamel finish especially formulated for chemical laboratory sinks. The material is said to be extremely dense, completely vitrified, entirely non-porous and free from voids, blebs and minute pore spaces. It is tough and is also resistant to thermal shock. As it is fired at temperatures in excess of 2250 deg. F., it is chemically inert to all acids and alkalis, except hydrofluoric acid. The white glazed surface of the new porcelain will not craze, crack or discolor. It is made by the *Laboratory Furniture Co., Inc.*, Long Island City, N. Y.

Crankcase Sealer

A NEW crankcase sealer which stands immersion in lubricating oils for four hours at 350 deg. F. and which is claimed to be unaffected by Freon, Carrene and other refrigerants has been announced by the *Roxalin Flexible Lacquer Co.*, Elizabeth, N. J. According to the maker this material does not chip or flake under sharp knocks and severe abrasion, air dries in regular lacquer time and is applied easily by spraying and slushing. It also seals in any sand particles remaining in the casting. It is colored red, but contains no abrasive pigments.

Anti-Corrosion Coating

CO-RES-CO is a new product being offered by the *Corrosion Control Corp.*, 212 Wright Street, Newark, N. J., for the protection of steel and other metals, concrete, wood or brick against many of the destructive forces of corrosion. Applied by spraying, brushing or dipping, it is said to effectively protect against extreme atmospheric corrosion, salt air and water, dilute acids and fumes, and alkalis. It is produced in three forms: Co-Res-Co black and olive green, and special black, the first two for all conditions other than alkaline, the last for severe alkaline conditions or a combination of alkaline and acid conditions. Aluminum coated with Co-Res-Co special black, has been immersed in concentrations of 10 to 50 per cent sodium hydroxide for more than a year without attack. Similarly, steel coated with the material has been partly immersed in 10 per cent nitric and also hydrochloric acid for more than a year without attack.

No prior treatment of the metal is necessary other than the removal of mill scale, loose rust, paint and grease, preferably by sand blasting or wire brushing. Co-Res-Co withstands dry heat of 600 deg. F. and liquid temperature of 150 deg. F. It dries in 24 hr.

Railroads Liberalize Demurrage Rules Oct. 1

AMENDMENT of the demurrage and storage rules with a view of aiding the railroads to hold or to encourage the return of traffic to the rails has been announced by the Car Service Division of the Association of American Railroads.

Among the amendments, to be effective Oct. 1, is one which allows a receiver of less-than-carload lot freight five days in which to claim the freight after being received at destination before it is subject to storage charges. The former rule permitted only four days. Another change permits a consignee of less-than-carload lot freight, who is located from 10 to 30 miles from the receiving freight station, 10 days in which to claim the shipment instead of five days as permitted under the old rule.

Under the old rule, when an empty car was delivered to a shipper for loading or a loaded car was delivered to the receiver for unloading, the railroads allowed two days free time for this work to be performed. If the work was not completed in that time, then four days additional were allowed in which a regular demurrage rate of $2.20 per day was charged. Beginning on the seventh day, if the loading or unloading had not been completed, then a penalty rate of $5.50 for each additional day the car was held was charged. The penalty rate has now been reduced from $5.50 to $3.30.

Another change makes provision for additional time allowance without charge when weather conditions delay the loading of a car.

In an effort to induce shippers to load freight cars more nearly to capacity, the existing rules also have been amended so as to allow seventy-two hours free time for the loading and unloading of freight cars containing twice or more than twice the minimum weight prescribed by tariff.

Further Business Gain Seen By Credit Group Leader

BETTER business after Labor Day is forecast by Henry H. Heimann, executive manager, National Association of Credit Men, in his monthly review of business.

"Whether or not the moderate, encouraging business upturn, which developed in the middle of July, holds through the summer weeks it can be regarded as a probable forerunner of better business after Labor Day," he said.

"The improvement in business should continue through the holiday season. Trade then should equal or better that experienced a year ago. On the whole, 1939 should prove better than 1938, both as to business volume and earnings. Whether it will equal the reasonably satisfactory year of 1937 is somewhat questionable, but the possibility does exist and the record of the next few weeks will be quite important as to this possibility being realized."

. . . CANADA . . .

. . . *Sustained steel operations expected over remainder of year*

TORONTO, Aug. 15—With the exception of a contract to Canadian Vickers, Ltd., Montreal, for six airplanes for the Canadian Government at a cost of approximately $1,000,000, no special developments appeared in Canadian industry. Domestic demand for iron and steel is seasonally quiet, but sales generally are somewhat ahead of those for the corresponding period a year ago. Most buyers are taking supplies on a hand-to-mouth basis and no large tonnage business is reported. Steel operations, however, are sustained and export demand for steel and armament supplies assures present operating schedules or better to the end of the year.

The automotive industry is getting ready to swing into new car production and good business is expected from this source, while various other lines of industry also are understood to be preparing for increased production for the closing months of the year.

Pig iron melters are showing only small interest in the market. Local blast furnace representatives do not look for much change in general conditions until there are prospects of price revision, which at this moment does not appear to be contemplated.

. . . PIPE LINES . . .

New York State Natural Gas Corp., 545 William Penn Way, Pittsburgh, plans steel pipe line from gas field area in vicinity of Erin, Chemung County, N. Y., to connection with present main pipe line system, for natural gas distribution. A pipe line gathering system will be installed in gas field district noted, where an extensive drilling campaign has been authorized in a 3000-acre tract for development of new wells, which also will require quantity of steel pipe for casing service. V. F. Bouyer is company engineer.

Godfrey L. Cabot, Inc., Charleston, W. Va., operating natural gas and carbon black properties, plans 8-in. welded steel pipe line across Elk River, near Charleston, buried to a minimum depth of two feet below bed of river, for natural gas transmission. Application has been made for Federal permission.

Center, Tex., plans pressure pipe line system for natural gas distribution. Also control station and main welded steel pipe line for connection with supply main of Apex Gas Co., Natchitoches, La., which plans early construction of a 6-in. welded steel pipe line from Joaquin gas field, Shelton County, Tex., for this purpose. Municipality has approved bond issue of $50,000 for system.

Waveland, Miss., plans pressure pipe line system for natural gas distribution, including main welded steel pipe line for connection with supply source, control station and other operating facilities. Bond issue of $47,000 has been voted for work.

Standard Oil Co. of Indiana, Inc., 910 South Michigan Avenue, Chicago, has made application for permission for construction for new 8-in. welded steel pipe line through Page, Fremont, Pottawattamie and Mills Counties, Iowa, forming section of proposed new 8-in. line from oil refining plant at Sugar Creek, Mo., to point near Council Bluffs, Iowa, about 180 miles, for gasoline transmission. Entire project will cost about $1,500,000.

Water Department, Tacoma, Wash., W. A. Kunigk, superintendent, will ask bids soon for installation of about 7928 lin. ft. of 30-in. steel pipe for main line in South Sixty-fourth Street, including about 873 ft. of 18-in. and 64 ft. of 16-in. cast iron pipe. Also for new 500,000-gal. reservoir at South Sixty-second and Cedar Streets, with pumping station.

Southern Natural Gas Co., Watts Building, Birmingham, plans welded steel pipe line from connection with present main system near Rome, Ga., to point near city limits of Chattanooga, Tenn., close to 60 miles, for natural gas transmission. Surveys have been authorized. Company has contracted to furnish natural gas to last noted city beginning Jan. 1, 1940. Cost about $500,000 with booster stations, terminal control station and other operating facilities.

Keystone Pipe Line Co., 260 South Broad Street, Philadelphia, plans steel pipe line through Federal aid depot military reservation at Middletown, Pa., for oil transmission. Federal permission has been granted.

Marysville, Wash., plans 12-in. steel pipe line from water source to city, about 9 miles, replacing present 8-in. supply lines. Cost about $100,000. Bond issue has been approved. Sievers & Deucy, 3124 Paine Street, Everett, Wash., are consulting engineers.

CAST IRON PIPE

Metropolitan Water District, Boston, recently closed bids on 30 tons of 36 to 60-in. and 100 tons of 36 to 72-in. fittings. Half the contract was awarded to the Warren Foundry & Pipe Corp. The remainder is unawarded.

Procurement Division, Treasury Department, Boston, has awarded 8900 ft. of 10-in. and 1750 ft. of 12-in. Class 150 pipe for a western Massachusetts flood control and water project to the United States Pipe & Foundry Co.

Cromwell Water Co., Orange, Conn., contemplates water supply improvements at Cromwell, Conn. No date has been set for bids. August Hugo is manager of the company.

Sherborn, Mass., has awarded a contract to Fred MacFarland, Main St., Sherborn, to make test wells for a contemplated water system. Bayard F. Snow, 14 Beacon Street, Boston, is engineer.

Monrovia, Cal., has awarded 3000 ft. of 6-in. and 3000 ft. of 8-in. pipe to American Cast Iron Pipe Co., Los Angeles.

Los Angeles Department of Water and Power has awarded 2600 tons of 6-in. and 8-in. pipe as follows: 1600 tons to United States Pipe & Foundry Co., San Francisco, 500 tons to American Cast Iron Pipe Co., Los Angeles and 500 tons to National Cast Iron Pipe Co., Los Angeles.

Fox Chapel Authority, Borough Building, Fox Chapel Road, Fox Chapel (Allegheny County), Pa., R. H. Boyles, secretary, asks bids until Aug. 25 for pipe lines for water system and accessory equipment (Contract No. 12). Chester Engineers, Inc., 210 East Park Way, Pittsburgh, is consulting engineer.

Slatington, Pa., plans pipe lines for extensions in water system in Union, Center and other streets, including fittings, service connections, meters, etc. B. J. Sieger is borough engineer.

Ansley, Neb., will take bids soon for pipe lines for water system and other waterworks installation, including pumping machinery and accessories. E. H. Dunmire, 1802 B Street, Lincoln, Neb., is consulting engineer.

Grand Island, Neb., plans pipe lines for water system in district No. 183, recently created.

Port Townsend, Wash., is considering extensions in pipe lines for water system in Chimacum district.

Elko, Nev., plans pipe lines for extensions and replacements in water system. Bond issue of $81,000 has been authorized for this and other waterworks installation.

Waldorf, Minn., plans pipe lines for water system and other waterworks installation. Bond issue is being arranged.

Hancock, Iowa, plans pipe lines for water system and other waterworks equipment. Special election has been called on Aug. 23 to approve project.

Andrews, Ind., closes bids Aug. 23 for 1900 lin. ft. of 8-in., and 1600 lin. ft. of 6-in.; also for other waterworks installation, including pumping station and two horizontal centrifugal pumps, each with capacity of 100 gal. per min., 100-gal. per min. deep-well turbine pumping unit, pressure filters and auxiliary equipment. Lewis S. Finch, Century Building, Indianapolis, is consulting engineer.

Elwood, Ind., plans pipe lines for extensions and replacements in water system, recently acquired from private interests, to be operated as municipal property in future. Also other waterworks improvements. Cost close to $30,000.

. . . GREAT BRITAIN . . .

. . . *New high production records expected by fall.*

LONDON, Aug. 15 (*By Cable*)—July output figures in United Kingdom show operations only slightly affected by holiday influences. Pig iron output rose by 28,000 tons to 743,600 tons. Steel production is 22,000 tons lower at 1,153,000 tons. Staggered workmen's holidays are minimizing stoppages. New high production records are possible in late autumn. Meanwhile works are heavily booked and steel deliveries are practically unobtainable before the end of October.

The scarcity in semi-finished steel has been relieved partially by heavy imports from the Continent and Dominions.

Sheet makers are assured of active employment till the end of the year and are not interested in export business.

Home railways have now commenced to place orders for steel. The Southern Railway ordered 12,000 tons of railway chairs from a British works.

The pig iron market is quieter owing to holidays in some parts of the country.

The Continental steel market has a good undertone, helped by additional orders of semi-finished steel from Great Britain. Holland and Scandinavia are buying plates and merchant bars. Belgian foundry pig iron sales office has been reconstructed provisionally till Sept 13 with the participation of French, Dutch, Belgian and Luxemburg makers. The Belgian home market is quiet owing to the holidays, but French steel works are quite active and are expecting still busier conditions. Spain is showing an interest in tin plate.

FABRICATED STEEL

. . . Lettings decline to 10,745 tons from 19,505 tons last week . . . New projects higher at 16,860 tons against 9680 last week . . . Plate awards only 1106 tons.

NORTH ATLANTIC STATES

AWARDS

2825 Tons, Pittsburgh, Water Street Improvement, Contract No. 6, to American Bridge Co., Pittsburgh.

1200 Tons, Philadelphia, Tasker housing project, to Bethlehem Steel Co., Bethlehem, Pa.

916 Tons, Newcastle County, Del., Cranston Heights viaduct, to Bethlehem Steel Co., through J. A. Bader & Co., Inc.

485 Tons, Pittsburgh, Terrace Village housing development, to Guibert Steel Co., Pittsburgh.

375 Tons, Kings Park Hospital, New York, Building No. 15, to Belmont Iron Works, Philadelphia.

350 Tons, Morris County, N. J., highway project, route 6, section 11A, to American Bridge Co., Pittsburgh.

255 Tons, Long Island City, N. Y., Stein Davies Building, to Schacht Steel Construction Co.

150 Tons, Wallingford, Conn., Hall Avenue bridge, to Bethlehem Steel Co.

125 Tons, Philadelphia, addition to Chester power plant, Philadelphia Electric Co., to Belmont Iron Works.

120 Tons, Niagara Falls, N. Y., plant addition, for the Vanadium Corp., to the Bethlehem Steel Co.

115 Tons, Fullers, N. Y., state bridge RC-4049, to Bethlehem Steel Co.

105 Tons, Cumberland County, Pa., P. T. C. bridge section 20A, to American Bridge Co., Pittsburgh.

100 Tons, Watkins Glen, N. Y., City, Hall, to the Ernst Iron Works, Buffalo.

CENTRAL STATES

300 Tons, Cincinnati, International Harvester Co. building, to Gage Structural Steel Co., Chicago.

300 Tons, Cincinnati, enlargement of baseball stadium, Cincinnati Baseball Club to American Bridge Co., Pittsburgh.

200 Tons, Quincy, Ill., Gardner-Denver Co., building to Michelmann Steel Construction Co., Quincy. Reported two weeks ago to unnamed fabricator.

200 Tons, Valparaiso, Ind., state bridge, contract No. 1820, to Bethlehem Steel Co.

189 Tons, Youngstown, Division Street bridge, to Hunter Steel Co., Neville Island, Pa., through Atlas Engineering Co., Youngstown.

180 Tons, Chicago, Fiske Street sub-station, Commonwealth Edison Co., to Vierling Steel Works, Chicago.

145 Tons, Freeburg, Ill., bridge Route 65, Sec. 151 to Missouri Bridge & Iron Co., Leavenworth, Kan.

130 Tons, Macedonia, Ohio, state buildings, Hawthornden Hospital, to Fort Pitt Bridge Works Co., Pittsburgh.

120 Tons, La Grange, Ill., Montgomery-Ward & Co., store building, to Gage Structural Steel Co.

105 Tons, Long Pine, Neb., 200 ft. viaduct to Illinois Steel Bridge Co., Jacksonville, Ill.

THE SOUTH

369 Tons, Morrison, Okla., highway bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.

310 Tons, Longview, Tex., Texas & Pacific railway station, to Mosher Steel Co., Dallas, Tex.

125 Tons, Muhlenberg County, Ky., bridge 186F to Virginia Bridge Co., Roanoke, Va.

WESTERN STATES

850 Tons, Los Angeles, Bureau of Power and Light, underground headquarters, to Bethlehem Steel Co.

300 Tons, San Francisco, turntables for the Southern Pacific Co., to R. W. Young Mfg. Co., Chicago.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

4500 Tons, New York, subway, section 6-B, route 110, Fulton Street.

2200 Tons, Jersey City, N. J., hospital building, unit "C."

506 Tons, Allegany County, N. Y., including 30 tons reinforcing steel, grade separation, project F.A.G.H. 8529, bids closing Aug. 30.

400 Tons, Brooklyn, reconstruction, Culver Rapid Transit railroad bridge.

350 Tons, Bronx, N. Y., reconstruction, bridge, East 168th Street.

325 Tons, Bronx, theater building for Metropolitan Life Insurance Co.

282 Tons, Monroe County, N. Y., includes 32 tons reinforcing steel, bridge and approach, highway project R.C. 4060, Jodomar, Inc., Rochester, N. Y., low bidder (previously reported).

275 Tons, Orange County, N. Y., including 76 tons reinforcing steel, grade separation, highway project R.C. 4033, John Arborio, Inc., Poughkeepsie, N. Y., low bidder (previously reported).

230 Tons, Enfield, N. H., Shaker Road bridge.

230 Tons, Downingtown, Pa., reconstruction Chestnut Street overhead bridge No. 31.57, for Pennsylvania Railroad.

200 Tons, Brooklyn, crane girders for U. S. Government.

200 Tons, Brentwood, Long Island, school building for Union Free School District.

183 Tons, Washington County, N. Y., grade separation, highway project F.A.G.M. 8533; bids due Aug. 30.

165 Tons, Allegany County, N. Y., including 47 tons reinforcing steel, two bridges and approaches, project R.C. 4055, Hornell Construction Corp., Hornell, N. Y., low bidder (previously reported).

150 Tons, Long Island City, N. Y., office and factory building for Metropolitan Refining Co.

150 Tons, Newark, N. J., Diocesan building for Diocese of Newark.

125 Tons, Sayreville, N. J., mill building extension for National Lead Co.

125 Tons, Wilkes-Barre, Pa., pumping station for U. S. Engineers office.

125 Tons, Baltimore, tank house for Brooklyne Chemical Works.

106 Tons, Washington County, N. Y., highway bridge, project R.C. 4068; bids close Aug. 30.

THE SOUTH

1000 Tons, Avondale, La., underpass; bids in.

850 Tons, State of Oklahoma, six highway bridges, the largest 504 tons; bids due Aug. 15.

800 Tons, Kelly Field, Tex., Air Corps operations hangar, for U. S. Government.

165 Tons, Zinc, Ark., bridges No. 154 and 155 for Missouri Pacific Railroad.

CENTRAL STATES

640 Tons, Steubenville, Ohio, power plant for the Ohio Edison Co.

550 Tons, Chicago, baking plant for Paul Schulze Biscuit Co., bids in.

360 Tons, Grafton, N. D., and Stephen, Minn., bridge No. 5872 for State of Minnesota.

165 Tons, Martins Ferry, Ohio, warehouse building for Wheeling Steel Corp.

130 Tons, Sandusky, Ohio, joists for store building; bids in.

WESTERN STATES

1000 Tons, Sacramento, Cal., Metropolitan Offices, Inc. building; K. E. Parker & Co., San Francisco, reported general contractor.

785 Tons, Cascade Locks, Ore., repairs on Bridge of the Gods; Tavares Construction Co., Los Angeles, general contractor.

200 Tons, McChord Field, Wash., additions to hangars; Sound Construction & Engineering Co., Seattle, general contractor.

110 Tons, Canyon Diablo, Ariz., state bridge.

FABRICATED PLATES

AWARDS

981 Tons, Jones Island, Wis., seven storage tanks for Standard Oil Co. of Indiana, to Chicago Bridge & Iron Co., Chicago.

125 Tons, Los Angeles, tank for Metropolitan Water District (Specification 310), to Pacific Iron & Steel Co., Los Angeles.

PENDING PROJECTS

Unstated tonnage, Toledo, 42-in. pipe for municipal intake feeders; Bids Sept. 1.

SHEET PILING

AWARDS

372 Tons, New York, Fire Island bulkhead, to Carnegie-Illinois Steel Corp., Pittsburgh.

245 Tons, San Francisco, Coast Guard air station, to Columbia Steel Co., San Francisco; through William Wills, San Francisco, contractor.

200 Tons, Niagara County, N. Y., state project R.C. 4045, to Bethlehem Steel Co.

PENDING PROJECTS

920 Tons, Toledo, municipal intake line, American Construction Co. awarded general contract.

860 Tons, Cleveland, municipal light plant expansion, Lombardo Brothers Construction Co., Cleveland, low bidder.

REINFORCING STEEL

ATLANTIC STATES

AWARDS

850 Tons, Philadelphia, Tasker Housing project, to Bethlehem Steel Co., Bethlehem, Pa.

800 Tons, New York, Paedegat Basin bridge, to Bethlehem Steel Co., Bethlehem, Pa., through P. J. Carlin, contractor.

600 Tons, Trenton, N. J., housing project to Sweets Steel Co. through Karno-Smith, contractor.

150 Tons, Cambridge, Mass., Massachusetts Institute of Technology swimming tank to Bethlehem Steel Co., Bethlehem, Pa. Aberthaw Co., Boston, contractor.

120 Tons, Newark, N. J., Branch Brook housing project, to Truscon Steel Co., Youngstown, through Leopold Neckerman, New York, contractor.

100 Tons, Springfield, Mass., sewerage plant to National Steel Products Co., Elmwood, Conn. Fuller Construction Co., Redbank, N. J., contractor.

100 Tons, Providence, viaduct to Truscon Steel Co., Boston. Coleman Brothers Corp., Boston, contractor.

CENTRAL AND WESTERN STATES

500 Tons, Chicago, Commonwealth Edison Fisk Street station, to Truscon Steel Co.

225 Tons, Detroit, Montgomery Ward & Co. building, to Bethlehem Steel Co. through O. W. Burke.

211 Tons, San Francisco, George Washington High School auditorium, to Herrick Iron Works, Oakland, Cal.; through De Luca & Son, San Francisco, contractor.

200 Tons, Bieber, Cal., bridge to Palm Iron Works, Sacramento, Cal.; through Poulos & McEwen and M. A. Jenkins, Sacramento, Cal., contractors.

200 Tons, Louisville, Ky., storage tanks, Proctor & Gamble Co., to Bethlehem Steel Co.

ATLANTIC STATES

1000 Tons, Pittsburgh, Municipal Hospital; Fleisher Engineering & Construction Co., Buffalo, low bidder.

600 Tons, New York, Corlears Hook Housing.

561 Tons, Portsmouth, Va., Norfolk Navy Yard, Requisition 81 (1940) PWA; bids Aug. 21.

500 Tons, Washington, Rock Creek diversion sewer, Piney Branch.

500 Tons, Brooklyn, section MS-39-15, Circumferential Highway; bids in.

460 Tons, Queens County, N. Y., grade separation, MS-39-15.

436 Tons, Delaware County, N. Y., including 86 tons structural steel, highway project R. C. 4066; bids due Aug. 30.

328 Tons, Saratoga County, N. Y., mostly mesh, highway project R. C. 4067. Bids close Aug. 30.

200 Tons, Deep Creek, Va., canal locks, to South Mills, N. C.

118 Tons, Nassau County, N. Y., highway project N.S.P. 39-1. Bids close Aug. 30.

CENTRAL AND WESTERN STATES

2000 Tons, Toledo, Ohio, Toledo water intake; Merritt-Chapman & Scott Co, low bidder.

1240 Tons, Cleveland municipal light plant addition at Cleveland. Lombardo Brothers Construction Co., Cleveland, low bidder.

247 Tons, Cascade Locks, Ore., repairs to Bridge of the Gods; Tavares Construction Co., Los Angeles, general contractor.

115 Tons, Antioch, Cal., plant addition; bids in.

. . . NON-FERROUS . . .

. . . Market interest subsides with most consumers well covered on nearby needs . . . Foreign copper cartel boosts production quota to 105 per cent . . . Differential between mill and flotation grades of zinc ore eliminated.

NEW YORK, Aug. 14—Buying of non-ferrous metals in the past week was not as active as in the preceding week, but was still at a good pace in consideration of the usually very dull conditions prevailing during the summer months. The lull in buying has no significance other than being a logical reaction to the recent heavy buying during which most consumers made commitments covering their needs well through the next three months. Buying in the domestic copper market in the past week accounted for about 5000 tons, bringing the total for the month through Saturday up to close to 26,800 tons. Producers' quotations are very firm at 10.50c. per lb., Connecticut Valley, and while there has been some business in the outside market at 10.35-10.375c. per lb., the general lack of interest has kept sales there at a minimum. Foreign demand has been holding up well. This morning's business was done in the neighborhood of 10.55c. per lb., c.i.f., usual base ports. Raising of the production quotas of members of the foreign cartel five points to 105 per cent, announced last week, is a reflection of growing shortage of nearby supplies abroad. This shortage has caused many European buyers to turn to this country for their requirements, a development which naturally has met with disfavor among the foreign producers. Current foreign stocks are equal to about six weeks' supplies as against a normal 90 days'. The boost in output, which will equal about 6000 tons per month, will not be felt for some months.

Lead

Buying in the past week, while still in excess of intake, was not up to the level of the preceding week. August requirements are almost completely covered while at least half of September is yet to be bought. Releases against contracts are reported to be coming through in excellent volume, indicating at least a 40,000-ton month.

Zinc

Sales in the past week were somewhat below those of the previous week, amounting to 4531 tons of all grades against 4779 in the preceding week, but in view of the heavy covering of a few weeks ago the dip is not causing concern. Shipments for the week were 4260 tons against 5271 in the preceding period. Backlog now stands at 50,230 tons. Domestic prices remain at 5.14c. per lb., New York, while a strengthening of the London price this morning brought it up to 3.04c. on spot. The tight situation in the Tri-State ore fields came to a head this week with the elimination of the $1 a ton differential between mill and flotation grades of ore.

Tin

Tin buyers evidenced very little interest in the market in the past week, buying being restricted to an occasional fill-in lot. Prices were little changed during most of the week at 48.70c. per lb., New York, for prompt Straits, edging up to 48.75c. on Monday. Tin plate makers persist in their cautious attitude toward forward coverage, with the consequence that there will undoubtedly be further substantial buying of comparatively nearby metal from this source before the season is over. This morning's London price on cash standards was £229 17s. 6d., the identical price of a week ago.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Aug. 9	Aug. 10	Aug. 11	Aug. 12	Aug. 14	Aug. 15
Copper, Electrolytic[1]	10.50	10.50	10.50	10.50	10.50	10.50
Copper, Lake	10.50	10.50	10.50	10.50	10.50	10.50
Tin, Straits, New York	48.70	48.70	48.70	....	48.75	48.75
Zinc, East St. Louis[2]	4.75	4.75	4.75	4.75	4.75	4.75
Lead, St. Louis[3]	4.90	4.90	4.90	4.90	4.90	4.90

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	49.75c.	51.50c.
Copper, Lake	11.625c.	11.50c.
Copper, electro	11.50c.	11.50c.
Copper, Castings	11.00c.	11.25c.
*Copper sheets, hot-rolled	18.62c.	18.62c.
*High brass sheets	16.85c.	16.85c.
*Seamless brass tubes	19.60c.	19.60c.
*Seamless copper tubes	19.12c.	19.12c.
*Brass rods	12.19c.	12.19c.
Zinc slabs	6.15c.	6.90c.
Zinc sheets, No. 9 casks	10.75c.	12.10c.
Lead, American pig	6.05c.	5.95c.
Lead, bar	8.50c.	8.25c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	29.32c.	29.50c.
Babbitt metal, commercial grade	21.32c.	21.50c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.375c.	9.00c.
Copper, hvy. and wire	7.375c.	7.75c.
Copper, light and bottoms	6.50c.	6.975c.
Brass, heavy	4.50c.	5.00c.
Brass, light	3.625c.	4.375c.
Hvy. machine composition	6.50c.	7.375c.
No. 1 yel. brass turnings	4.25c.	4.75c.
No. 1 red brass or compos. turnings	6.375c.	6.875c.
Lead, heavy	4.125c.	4.50c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	12.50c.	14.00c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York: Asiatic, 14c. a lb., f.o.b.; American, 12c. a lb. QUICKSILVER, $84 to $87 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.75c. a lb.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

General American Tank Storage & Terminal Co., 50 West 50th Street, New York, plans new asphalt plant at oil storage and distribution terminal on Lafayette Street, Carteret, N. J., comprising several buildings with steel tanks and other structures. Cost about $100,000 with equipment.

Union Carbide & Carbon Corp., 40 East 42nd Street, New York, has acquired tract of land on Houston ship channel, Texas City, Tex., and will use as site for new branch plant, consisting of several one and multi-story units, with power house, machine shop and other mechanical structures. It is understood that part of new plant will be used for plastics manufacture, utilizing petroleum gases from refinery of Pan-American Petroleum & Transport Co., on neighboring site. Work is scheduled to begin early next year. Cost reported over $1,000,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 22 for 140 oxygen cylinders with closing valves (Schedule 6942); until Aug. 25 for one air compressor, 3500 lbs. per sq. in. delivery pressure, and 20 cu. ft. per min. free air capacity (Schedule 6980), 24 pneumatic wrenches, bolting-up rotary type, reversible (Schedule 6981) for Brooklyn Navy Yard; until Aug. 22 for 12 electric motors, complete with control equipment and spare parts (Schedule 6955) for Brooklyn and Philadelphia yards.

Department of Public Works, City of New York, 54 Lafayette Street, has filed plans for new one-story equipment service, repair and garage building, 189 x 247 ft., at 28-32 126th Street, Flushing, L. I. Cost about $425,000 with equipment.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Aug. 23 for 25 to 31 8-in. gun liner forgings (Circular 40); until Aug. 25 for quantity of breech ring alloy steel forgings (Circular 45).

National Biscuit Co., 449 West Fourteenth Street, New York, has let general contract to Barrett & Hilp, 918 Harrison Street, San Francisco, for new two-story factory branch, storage and distributing plant at Oakland, Cal. Cost over $65,000 with equipment. F. L. Stearns, first noted address, is company architect.

National Gypsum Co., 190 Delaware Avenue, Buffalo, has filed plans for three-story addition, 103 x 800 ft., at branch plant at East River and East 150th Street, Bronx, New York. Cost over $250,000 with equipment. This is part of expansion and improvements to be made at this plant.

Signal Corps Procurement District, Army Base, 58th Street and First Avenue, Brooklyn, asks bids until Aug. 21 for quantity of plugs (Circulars 21, 23 and 27); until Aug. 22 for 17,450 jacks (Circular 28), quantity of plugs (Circular 25), 900 reels (Circular 26); until Aug. 23 for 40,000 flexible shafts, 12,000 nuts, 13,400 spline and hub assemblies, 12,750 flanged sleeves and 8000 tags (Circular 30), quantity of plugs (Circular 29), 28,600 ft. of flexible shafting, 4600 sleeves, 1850 keys, 26,000 ft. of flexible casing, 1600 nuts, 2900 control units, etc. (Circular 31).

State Purchasing Commissioner, State House, Trenton, N. J., asks bids until Aug. 28 for quantity of 3-gage traffic signal poles; also for quantity of power sprayers.

R.C.A. Mfg. Co., Camden, N. J., has let general contract to J. L. E. Price & Co., Ltd., 680 Sherbrooke Street West, Montreal, Que., for two-story and basement addition, 60 x 150 ft., to branch plant at 976 Lacasse Street, Montreal, operated in name of R.C.A.-Victor Co., Ltd. Cost over $75,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Aug. 22 for quantity of cement-coated sinker nails, copper wire nails, steel nails and other nails (Circular 142), for six machines for cartridge case manufacture, all motor-driven, including one for body annealing, cal. 0.50; for gaging, cal. 0.50; mouth annealing, cal. 0.50; primer inverting, cal. 0.30; first and second trim, cal. 0.50; and for canneluring and resizing, cal. 0.30 (Circular 44); until Aug. 23 for quantity of drills, and quantity of drills and countersinks combined (Circular 152); until Aug. 25 for 37,000 steel fin assemblies for 100-lb. demolition bombs.

Barrett Co., Margaret and Bermuda Streets, Philadelphia, manufacturer of prepared roofing, etc., has filed plans for one-story addition for storage and distribution of coal tar products. Cost close to $40,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, plans additions to machine shops at Philadelphia Navy Yard. Appropriation of $375,000 has been authorized, including equipment. Also will make extensions and improvements in power plant at same yard, for which appropriation of $200,000 is available, including equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Aug. 23 for machines for cartridge case manufacture, including one or two machines for end trim finish, cal. 0.50; one or two machines for bullet jacket trim, cal. 0.30 tracer; one to five machines for end trim finish, cal. 0.30; two or four machines for charging tracer bullets, cal. 0.30 (Circular 45).

BUFFALO DISTRICT

Swanson Machine Co., 59 Hopkins Avenue, Jamestown, N. Y., manufacturer of machinery and parts, plans one-story addition, for which bids will be asked on general contract early in fall. Cost close to $50,000 with equipment. Oliver R. Johnson, Fenton Building, is architect.

Quartermaster, Fort Ontario, N. Y., asks bids until Sept. 1 for one tractor unit with sickle bar and three-gang cutting equipment (Circular 646-2).

Chevrolet Motor & Axle Division, General Motors Corp., Tonawanda, N. Y., will install new machinery, equipment and dies for production of new 1940 model cars, including rearrangement of certain present equipment. Cost over $1,000,000. Work scheduled to proceed at once.

Corning Glass Works, Corning, N. Y., will take bids soon on general contract for five-story and basement technical and experimental laboratory, 80 x 125 ft. Cost over $100,000 with equipment.

NEW ENGLAND

Blake & Johnson Co., Thomaston Avenue, Waterville, Conn., has let general contract to W. J. Megin, Inc., Naugatuck, Conn., for one-story addition, 122 x 200 ft. Cost close to $85,000 with equipment.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Aug. 21 for six inter-shop trailers (Circular 34), six sets of portable welders (Circular 20); until Aug. 23 for quantity of steel and bronze castings (Circular 27).

Salem Gas & Electric Lighting Co., Salem, Mass., plans rebuilding of portion of two-story electric station, including coal-handling and storage department, recently destroyed by fire. Loss about $50,000 with equipment.

United Aircraft Corp., Pratt & Whitney Division, South Main Street, East Hartford, Conn., has let general contract to R. G. Bent Co., 93 Edwards Street, Hartford, for one-story addition at rear of local plant of Hamilton Standard Propeller Division, to be used as an engine testing works. Cost about $100,000 with equipment.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Aug. 23 for two 12-in. motor-driven, crank-type shapers (Circular 26).

WASHINGTON DIST.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Sept. 5 for two oil-fired boilers, complete with oil burners and burner accessory equipment, forced-draft equipment, with instruments, piping, etc., in boiler plant; also for two coal-fired stoker boiler units, complete with stokers, forced-draft equipment, instruments, piping, etc. (Circular 42).

Dr. Pepper Bottling Co., Roanoke, Va., has let general contract to B. F. Parrott & Co., Boxley Building, for two-story and basement mechanical-bottling plant, with two one-story wing extensions. A machine shop, storage and distributing department and pumping station will be installed in basement. Cost over $60,000 with equipment. Randolph Frantz and John M. Thompson, Boxley Building, are architects.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Aug. 23 for one-story machine and pipe shop, 100 x 283 ft., at Portsmouth, N. H., Navy Yard (Specifications 9292), one motor-driven air compressor with inter-cooler and after-cooler, for installation at Norfolk Navy Yard, Portsmouth, Va. (Specifications 9346).

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Sept. 1 for quantity of motor truck parts, including axles, hand brakes, malleable iron castings, nuts, screws, rivets, steering gears, pipe, tanks, junction blocks, bumpers, friction ball catches, fasteners, water pumps, fenders, tubing, etc. (Circular 398-8). Plans are under way by Construction Quartermaster, Holabird depot, for new three-story laboratory building, for which bids will be asked soon. Cost about $300,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 22 for 575,000 lin. ft. of 1/8-in. diameter plow steel wire rope (Schedule 6941) for Williamsburg, Va.; one motor-driven double-spindle machine (Schedule 6935), 220 phosphor bronze shells and 115 sheet-steel shells (Schedule 6934) for Alexandria, Va.; three motor-driven thread-milling machines and equipment (Schedule 6964) for Washington yard; 48,800 lbs. steel spikes (Schedule 6498), four motor-driven vertical boring and turning mills, and special tools, etc. (Schedule 6921); until Aug. 25, for quantity of motor-driven ventilating sets (Schedule 6958) for Eastern and Western navy yards; two electrically-operated, triple-drum winches with spare parts (Schedule 6952) for Norfolk navy yard, Portsmouth, Va.

SOUTH ATLANTIC

Merrill-Stevens Dry Dock Co., N. W. Seventeenth Avenue and Miami River, Miami, Fla., plans one-story addition for yacht service, with reconditioning, repair and storage facilities. Cost about $80,000 with equipment. Bids will be asked soon on general contract. Alexander M. Balfe is general manager.

Polk Co., Haines City, Fla., citrus fruit canner, plans new branch canning plant on five-acre tract of land near Columbus Drive, Tampa, Fla., consisting of several one-story units with power house and other mechanical departments. Cost close to $50,000 with equipment.

Southern Wire & Iron Works, Inc., 127 Fair Street, S. E., Atlanta, Ga., manufacturer of iron and steel products, wire goods, etc., has let general contract to Straiton, Hard & Co., Inc., Mortgage Guarantee Building, for

one-story plant, 125 x 160 ft., with office building adjoining. Cost over $60,000 with equipment. James C. Wise, Spring Street Building, is architect.

SOUTH CENTRAL

Coca-Cola Bottling Co., Shreveport, La., plans immediate call for bids on general contract for new one and two-story mechanical-bottling plant at 275 Stoner Avenue, including storage, distributing and other operating departments. Cost close to $250,000 with equipment. Jesse M. Shelton, Bona Allen Building, Atlanta, Ga., is architect.

United States Engineer Office, Louisville, asks bids until Sept. 5 for three 10,000-gal. water tanks and towers at Locks Nos. 43, 48 and 53, Ohio River respectively.

Director of Purchases, TVA, Knoxville, Tenn., asks bids until Aug. 24 for about 140,000 lbs. of castings for lock culvert lining, Kentucky dam.

United States Engineer Office, Vicksburg, Miss., asks bids until Aug. 25 for 150,000 non-corrosive wire rope clips (Circular 26), about 140,000 lin. ft. of plow steel wire rope (Circular 27).

WESTERN PA. DIST.

Allegheny Ludlum Steel Corp., Oliver Building, Pittsburgh, plans one-story addition to branch plant at Dunkirk, N. Y., to be equipped as a machine shop. Cost about $45,000 with equipment.

United States Engineer Office, New Post Office Building, Pittsburgh, asks bids until Aug. 21 for one cast iron sluice gate (Circular 69).

Pennsylvania Coal & Coke Corp., Marsteller, Cambria County, Pa., has let contract to Fairmont Machinery Co., Fairmont, W. Va., for rebuilding of steel coal tipple at coal-mining properties near Marsteller, destroyed by fire a number of months ago. Cost over $50,000 with equipment.

SOUTHWEST

Shell Oil Co., Inc., Shell Building, St. Louis, has approved plans for further expansion and modernization in main oil refining plant at Wood River, Ill., where extensions and improvements have been in progress for several months. Work will include new buildings and installation of equipment for high-test gasoline production, extensions in coking plant, additional facilities for by-products manufacture, additions to tank storage department to increase capacity by 100,000 bbl., and other structures. Crude oil-handling capacity will be advanced from 50,000 to 75,000 bbl. per day. Entire project will represent investment of about $8,000,000.

State Building Commission, Merchants' Bank Building, Jefferson City, Mo., Edgar M. Eagan, executive secretary, Bi-Partisan Advisory Board, will take bids soon for extensions and improvements in boiler plant at local state prison, with installation of additional equipment. Cost close to $110,000. Also bids for new diesel engine-generating plant at local auxiliary prison. Cost about $50,000. Baumes Engineering Co., Railway Exchange Building, St. Louis, is consulting engineer.

Quartermaster, Randolph Field, Tex., asks bids until Aug. 22 for one lathe, surfacer, shaper, pipe and nipple-threading machine, grinder, woodworking machine, power-feed wood-working machine and one electric drill, all motor-driven (Circular 780-10).

Central Power & Light Co., San Antonio, Tex., plans new steam-electric generating plant at Corpus Christi, Tex., supplementing present power station at that place. Company also will make extensions in transmission lines in same district. Cost reported over $500,000.

Hobbs Mfg. Co. of Houston, 3100 McKinney Street, Houston, Tex., manufacturer of motor trailers and bodies for industrial and oil field use, has let general contract to R. C. Paul, 4114 Glenbrook Court, for one-story plant unit for parts production and assembling. Cost close to $60,000 with equipment.

OHIO AND INDIANA

Strietmann Biscuit Co., 12th Street and Central Parkway, Cincinnati, a subsidiary of United Biscuit Co. of America, Inc., 1041 West Harrison Street, Chicago, plans new plant on tract of about 15 acres of land recently acquired in Mariemont section, comprising main one and two-story baking unit and number of adjoining buildings for storage, distribution, etc. A power house will be built. Cost close to $2,000,000 with traveling ovens, conveyors, mixers and other mechanical-handling equipment. John H. Deeken, 800 Broadway, is architect.

Champion Paper & Fibre Co., Inc., Hamilton, Ohio, has let general contract to Merritt-Chapman & Scott Corp., 17 Battery Place, New York, for addition to branch sulphite pulp and paper mill at Pasadena, near Houston, Tex., operated as Houston Division. It will comprise several one and multi-story units to be equipped for coated paper production for magazine and other purposes. Cost about $3,000,000 with machinery. Completion is scheduled in spring of 1940. H. K. Ferguson Co., Hanna Building, Cleveland, is engineer.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 21 for one precision lathe (Circular 76), 776 bench vises, 120 drill vises, 40 hand vises and four machine vises (Circular 80), 1680 chain pliers, 1636 combination pliers, 1380 curved pliers, 1811 diagonal cutting pliers and 80 flat nose pliers (Circular 72); until Aug. 22 for about 3000 drills and countersinks (Circular 87), quantity of vacuum pressure gage assemblies (Circular 86), quantity of carburetor assemblies (Circular 70), 648 spanner, hook and adjustable-type wrenches (Circular 84), quantity of valve assemblies (Circular 88); until Aug. 23 for 537 tap wrenches (Circular 83), quantity of magneto assemblies (Circular 89).

Town Council, Andrews (Huntington County), Ind., asks bids until Aug. 23 for 75,000-gal. elevated steel tank and tower for municipal water system. Lewis S. Finch, Century Building, Indianapolis, is consulting engineer.

District Quartermaster, CCC, Fort Benjamin Harrison, Ind., asks bids until Aug. 22 for quantity of twist drills, two bench-type drill presses, four motor-driven wood-turning lathes, 28 hand-power bench grinders, three motor-driven bandsaws, etc. (Circular 5501-13).

MICHIGAN DISTRICT

Stinson Aircraft Corp., Wayne, Mich., will take bids soon on general contract for one-story plant unit on Michigan Avenue. Also for two-story office building. Cost over $75,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Fisher Body Division, General Motors Corp., General Motors Building, Detroit, has let general contract to Jerome A. Utley, 6031 Mansur Street, for extensions and improvements in three buildings at branch plant at Flint, Mich. Cost over $60,000 with equipment.

Murray Corp. of America, Inc., 7700 Russell Street, Detroit, has leased industrial property at Belding, Mich., heretofore known as White mill building, used as a silk mill, and will remodel and equip for new branch plant for production of steel springs for automobile seats and kindred products. It is scheduled to be ready for service by close of year. Equipment and facilities will be installed for employment of about 250 persons.

Quartermaster, Fort Brady, Mich., asks bids until Aug. 21 for quantity of brass pipe, wrought iron pipe, soil pipe, pipe fittings, traps, valves, switch plates and other equipment (Circular 158-2).

MIDDLE WEST

Steel Sales Corp., 129 South Jefferson Street, Chicago, has let general contract to Kaiser Ducett Co., 80 East Jackson Boulevard, for new two-story storage and distributing plant, 60 x 180 ft., with office structure adjoining, at Thirty-third Street and Pulaski Road. Cost over $75,000 with equipment. Lieberman & Hein, 190 North State Street, are engineers.

Greenlee Brothers & Co., 2136 Twelfth Street, Rockford, Ill., manufacturer of woodworking machinery, tools, etc., has let general contract to John M. Anderson, 960 Ridge Avenue, for one-story addition, 40 x 50 ft., to be equipped as a metal-treating unit. A. C. Woods Co., 1129 Harrison Avenue, is engineer.

Constructing Quartermaster, Chanute Field, Rantoul, Ill., asks bids until Sept. 1 for two boiler units and accessory equipment for installation in local power house.

Northwestern Malt & Grain Co., 166 West Jackson Boulevard, Chicago, plans rebuilding of portion of processing plant and grain elevator at 4600 Cortland Street, recently destroyed by fire. Loss about $100,000 with equipment.

Water and Light Department, Fennimore, Wis., will take bids soon for three diesel engine-generator units and auxiliary equipment for installation in municipal power plant. W. G. Kirchoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer.

Standard Oil Co. of Indiana, Inc., 910 South Michigan Avenue, Chicago, plans new bulk oil storage and distributing plant at Milwaukee, comprising several one-story buildings, steel storage tanks with capacity of about 900,000 gals., pumping station and other structures. Cost over $85,000 with equipment.

City Council, Springfield, Minn., asks bids until Aug. 30 for extensions and improvements in municipal electric power plant, including equipment installation. Charles Foster, Medical Arts Building, Duluth, Minn., is consulting engineer.

John Deere Harvester Works, Inc., Moline, Ill., has let general contract to Axel Carlson Co., Moline, for one-story addition, 96 x 320 ft., for storage and distribution. Cost about $50,000 with equipment.

PACIFIC COAST

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Sept. 6 for three one-story industrial buildings at naval air station at Alameda, Cal., for aircraft storehouse, general storehouse and paint and oil storehouse respectively; also for power plant at same station (Specifications 8990). Also bids (no closing date stated) for one 24-ton diesel-electric revolving jib crane mounted on steel pontoon at navy yard, Mare Island, Cal. (Specifications 9368).

Helm's Bakeries, Inc., 8800 Venice Boulevard, Los Angeles, has let general contract to Grant & Bruner, Ferguson Building, engineers, for two one-story additions, 80 x 395 ft., for new loading and distributing department, and 60 x 80 ft., for storage service. Cost over $75,000 with equipment. Engineers noted prepared plans.

Walt Disney Productions, 2400 South Alameda Street, Burbank, Cal., has asked bids on general contract for new power house at motion picture studio. Cost about $40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 25 for one car-type sandblast cleaning room, complete with mechanical conveyor, and for one similar sandblast room, complete with pneumatic conveyor (Schedule 6926), three motor-driven, geared-head precision toolmakers' lathes and spare parts (Schedule 6543); until Aug. 29 for quantity of cast bronze pipe fittings (Schedule 6993) for Mare Island, Cal., navy yard; until Sept. 1 for four electric-operated ovens for armature baking, with spare parts (Schedule 6953), four coil-winding machines, complete with motors and controllers, and spare parts (Schedule 6977) for Puget Sound, Wash., navy yard.

Bureau of Reclamation, Denver, Col., asks bids until Aug. 23 for one gantry crane, capacity 14 tons, for raising and lowering draft-tube bulkhead gates at Grand Coulee hydro-electric power plant, Grand Coulee, Columbia Basin project, Wash. Equipment will be installed by Government (Specifications 1267-D).

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Trade expects a good fall business . . . Trend of sales is upward . . . Chevrolet spending $1,250,000.

Chevrolet Is Spending $1,250,000 at Buffalo

DETROIT—Indicative of the principal activity in automotive plants is the recent announcement by Chevrolet that approximately $1,250,000 is being spent at the axle and engine plant at Buffalo in rearranging its equipment for new models. The expenditure will include tools, dies, machinery and installation work. Aside from the pressing job of getting new equipment lined up for production, there is little other activity.

Milwaukee Machine Tool Plants See Business Gain

MILWAUKEE — Milwaukee machine tool manufacturers have been experiencing substantial business increases so far this month, according to reports here. Officials of various concerns in Milwaukee pointed out that domestic orders have been aided apparently by the letting of some armament work by Washington and by improved business sentiment which has developed since defeat of the spend-lend bill and other New Deal measures. It was pointed out, however, that much of the business at present in this area is still foreign work.

Chicago Trade Anticipates A Good Fall Business

CHICAGO—Small tool business, down 40 per cent in July as compared with June, has reversed that trend and in the past week has picked up considerably. Machine Tool orders also are coming in at a fairly good rate, and Chicago machinery sellers foresee satisfactory conditions ahead for the fall months. The Rock Island Arsenal is inquiring for a contour measuring projector.

Trend of Business Is Upward at Cincinnati

CINCINNATI—Machinery bookings the past week swung upward to a level which is just a trifle better than the July average. Lathe demand recovered from the slight decline of last week and manufacturers of milling machines and grinders say that demand during the current week is even better than in the past week, which combined with a steady demand for other types of tools placed total sales above the July level. Domestic ordering during the past week was stimulated by the placing of several Government orders for milling machines and grinders in this area and some automotive demand for other types of tools. The exact quantities and destinations were not disclosed. While the bulk of foreign ordering indicates possible use for armament programs, one manufacturer reported the sale of machines to foreign automobile manufacturers.

Production is up a few points over last week to about 70 per cent. This improvement is the result of better operations among drill manufacturers, since plants experiencing heaviest demand have already boosted production almost to capacity. No shortage of skilled labor is reported. Deliveries are still extended and no improvement is in sight.

New York Tool Dealers Envisage Active Fall

NEW YORK—Sales here continue to hold at a pace substantially above expectations and the large lists of inquiries still pending encourage the belief that the fall will be an extremely active period. Another encouraging factor is the growing number of old propositions, some as much as five and six years old, which are being revived and acted upon. There were several sizable purchases in the past week, but the bulk of current activity is confined to small machines. One exception to this condition was the placing of an order with a local dealer in the past week for what is said to be one of the largest radial drills ever produced. The drill, purchased by General Electric Co. for its turbine department at Schenectady, has a 26-in. column, a 12-ft. arm and has 13½ ft. under the spindle.

Unions Win Better Contracts From Employers Since 1937

ORGANIZED labor has taken advantage of its opportunities for collective bargaining during the past two years to gain increasingly favorable contracts from management, according to an anlysis of union agreements recently completed by the management research division of the National Industrial Conference Board.

A total of 114 union contracts was examined in the recent investigation. The Conference Board's 1937 survey, with which the current one is compared, covered 90 union contracts, of which 38 were with AFL unions and 52 with CIO unions.

The number of closed-shop agreements rose from 17 to 34 during the two-year interval, and almost the entire gain was made by the AFL, which had 28 contracts with this clause in comparison with 12 in 1937. The CIO had only two closed shop agreements in 1939 against five in 1937. Four of the seven independent unions whose contracts were examined provide for the closed shop.

There was also a gain in the number of contracts containing the check-off provision—the deduction of union dues from payrolls. In 1937 there were only two instances of the check-off, both in AFL contracts, while in 1939 there were seven, three with AFL unions and four with CIO unions.

Marked progress was made in the attainment of union aims for preferential hiring by management; that is, an agreement by the management to give the union the first opportunity to provide applicants for employment. The 1937 survey did not disclose a single instance of preferential hiring; 18 of the contracts just analyzed contain this clause. Of these, nine were with the AFL, eight with the CIO, and one with an independent union.

Other respects in which organized labor is meeting with increasing success are in securing the abandonment of incentive wage systems, in the establishment of regular grievance procedures and in securing more favorable provisions regarding seniority.

Machine Tool Index Again Holds Above 200

CLEVELAND—The machine tool order index for July reached 230.9, the third successive month in which the index has held above 200, according to the National Machine Tool Builders' Association. This compares with 211.6 in June.

While sustained foreign demand accounts for approximately half the total volume, gradual improvement in the distribution of orders throughout the industry indicates a broadening domestic demand. In 1936, 75 per cent of the business placed was of domestic origin.

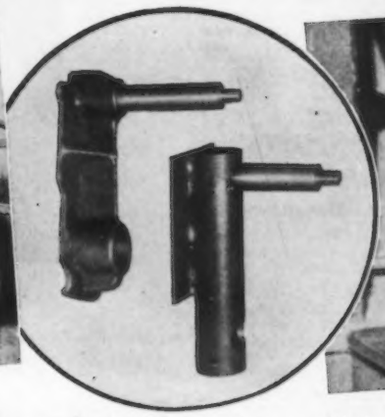
Imports at Philadelphia

PHILADELPHIA—The following iron and steel imports were received here during the past week: 9 tons of manganeses ore and 40 tons of structural shapes from France; 27 tons of manganese ore from French Morocco; 8800 tons of manganese ore from West Africa; 100 tons of ferromanganese from Yugoslavia; 40 tons of steel tubes, 6 tons of wire rods, 100 tons of sponge iron, 1 ton of steel strips and 19 tons of steel bars from Sweden; 9 tons of steel bars, 29 tons of steel bands and 86 tons of structural shapes from Belgium; 1183 tons of pig iron from British India.

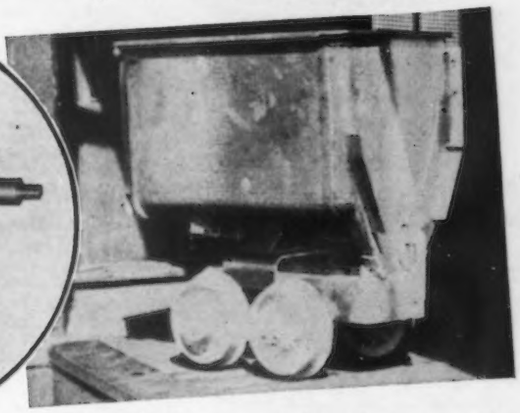
GET AHEAD WITH WELDING

Be the man who gets credit for economies and improvements like these

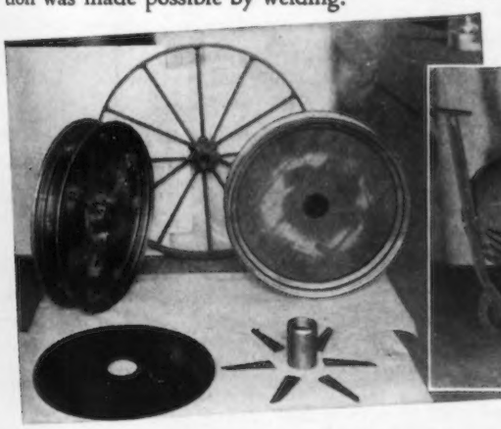
You can gain recognition for advancement by using welded steel for developing machines that would be impractical or uneconomical to build by other methods. Example: This all-welded sugar cane harvester, designed and built by R. G. Le Tourneau, Inc., Peoria, Ill., for lowering harvesting costs. Its construction was made possible by welding.



Change over one part at a time to welded steel construction. Example: A bearing for a cement buggy. Former construction, shown on the left, weighed 12 lbs. Welded steel bearing, shown on the right, eliminates five drilling operations and one slotting operation. It weighs 8¼ lbs. and is unbreakable.



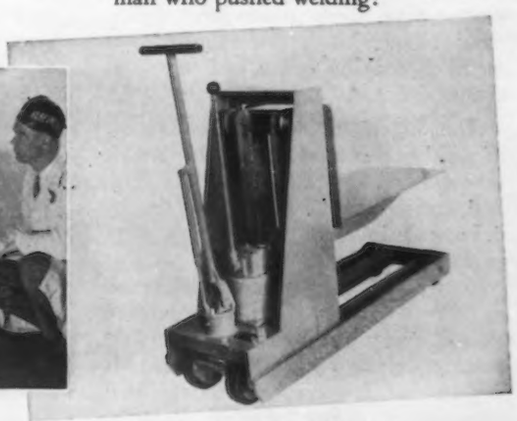
Welding saves weight, reducing operating cost of materials handling equipment such as this copper ore car. Formerly riveted, it weighed 1300 lbs. Built with 5/32" high-tensile steel plate—welded with *"Shield-Arc 85"* Electrode—the car weighs only 700 lbs.—600 lbs. less to pull around! That's headway for the man who pushed welding!



You have exceptional engineering freedom in designing for welding because you have your choice of scores of different shapes and types of steel. Example: A wheel for a cement buggy, built from pressed steel rim, plate disc and stiffeners and pipe hub. Former design is shown in the background. Photos of wheel and bearing (above) courtesy Red Star Products Co., Cleveland, Ohio.

For widest welding range and lowest welding costs, see that your shop is equipped with Lincoln Welders. Both *"Shield-Arc"* (left) and *"Shield-Arc Junior"* (right) have exclusive Self-Indicating "Job Selector" and Current Control for maximum speed and quality on every job.

For further details, consult the nearest office or mail the coupon



Increased sales appeal can be secured by streamlining machines with welded design. This neat-appearing lift-truck is of practically 100% welded steel construction using bars, plate and angle. With welded design, a wide range of types and capacities can be produced at minimum cost, without delay. Photo courtesy Lyon Iron Works, Greene, N. Y.

Largest Manufacturers of Arc Welding Equipment in the World

THE LINCOLN ELECTRIC COMPANY

CLEVELAND, OHIO

THE LINCOLN ELECTRIC CO., Dept. X-628, Cleveland, O.

Send free booklet ☐ "How to Change Over to Welded Design for Profit." ☐ New *"Shield-Arc."* ☐ New *"Shield-Arc Junior."*

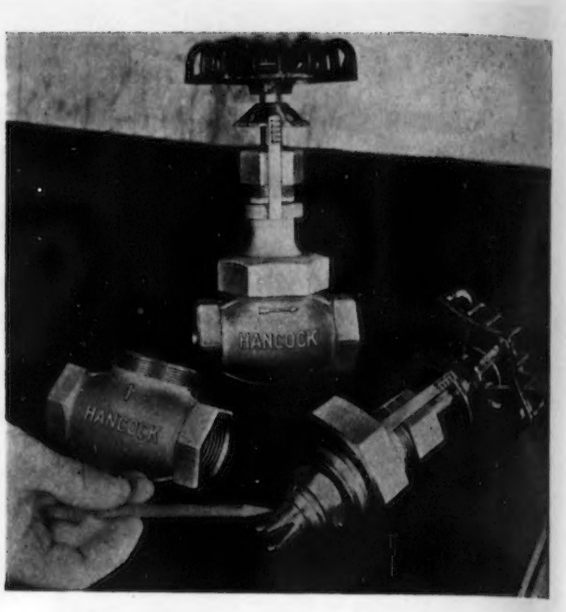
Name _____ Position _____

Company _____

Address _____

City _____ State _____

Valve Speeds Pipe Manufacture



BY LOUIS "500" BRENDEL
Hancock Valve Division, Manning, Maxwell & Moore, Inc.

CAST iron pipe manufacture not so very long ago was a slow and cumbersome operation. Molds and cores had to be carefully made and set up so as to compensate for distortion and warping during the cooling process. Furthermore, for large diameter pipe, these molds were bulky, cumbersome things that required tremendous foundry space and enormous cranes for handling.

The ingenious centrifugal process of making cast iron pipe in steel molds revolutionized the industry. The original commercial process, invented by deLavaud in 1914, went through a period of great improvement in this country, and today's super-deLavaud equipment would hardly be recognized as the direct descendant of the first machine erected in this country. It consists of a traveling carriage that supports a water-jacketed rotating steel mold. The entire mold and carriage is on a slight incline, and into this mold extends an inclined trough which is fed by an automatic ladle containing sufficient iron to form a pipe. The inclined carriage moves upward over the distributing trough until the lower end of the trough is inside the lower end of the mold. Then with the mold spinning at a high speed, the carriage slowly starts back down the incline away from the distributing end of the trough. However, during this movement, the trough is distributing an even flow of molten iron which is thrown by centrifugal force against the walls of the mold in an even, homogeneous, close-grained form.

It is vitally important that the travel of the mold and carriage down the inclined plane have exactly the proper speed, otherwise uniformity of the pipe wall might be sacrificed. In other words, if it went slowly during one portion of its travel, the pipe would be too thick, and if it speeded up in another, the pipe wall thickness would at that point be too thin.

This carriage travel speed is controlled by regulating the flow of water under hydraulic pressure against a piston attached to the carriage. For years, many producers have found it difficult to provide some simple means for the operator to control this carriage travel speed so that it might take the carriage up the incline rapidly and bring it down at precisely the correct slower speed for casting the pipe. This was further complicated by the necessity of having a different speed of downhill travel for different sizes of pipe and also for different analyses of molten iron.

A positive and low-cost control of this difficult problem was recently incorporated in a machine by George Akeroyd, chief engineer, and Frank Begley, master mechanic of National Cast Iron Pipe Co., a division of James B. Clow & Sons, Birmingham. The installation makes use of special Flocontrol valves, with an easily-read indicating dial and pointer, that provide hairline proportional throttling of the hydraulic pressure. Thus, for little more than the cost of an ordinary valve, production is said to have been increased noticeably; since operators can now make correct settings for the downhill carriage run more quickly. At the same time it is possible to instantly take advantage of full speed on the up-grade run.

In essence, this downgrade speed control is very similar in action to the counter-recoil cylinder found on large naval guns. That is, the explosion of the powder causes the guns to jump backward, or recoil. This recoil is taken up in special shock absorbing springs, which in turn tend to slam the gun back into normal position. It is desired, however, that the gun be returned to position smoothly, rather than with a jolt, so for this purpose special liquid cushioning cylinders are provided to permit the gun to return to its original position without excessive jar.

Certain types of deLavaud machines control the tipping speed of the feeding ladle hydraulically. Such ladles are also under finer control through the use of such a valve. A view of a Flocontrol valve of this type which gives straight line or proportional flow is shown in the illustration. It will be noticed that the valve disk is specially machined with V-notches so that the flow through the valve increases constantly and uniformly for each hundredth of a turn of the handwheel. This enables an operator to determine the proper setting, and by means of the dial and pointer instantly return to that setting without fumbling around and losing valuable time.

PRODUCTS INDEX

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassert, H. A., & Co., Chicago, Ill.
Demag Corp., Duisburg, Germany

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N.Y.C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
Buffalo (N. Y.) Forge Co., 492 Broadway.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

BOLT CUTTERS
Landis Mch. Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

BOLT AND NUT MACHINERY
Acme Machinery Co., The, Cleveland.
Ajax Mfg. Co., The, Cleveland, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT POINTING MACHINES
Acme Machinery Co., The, Cleveland.

BOLT & RIVET CLIPPERS
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOLTS—Special
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Stove
Progressive Mfg. Co., Torrington, Conn.

BOLTS—Stove, Recessed Head
American Screw Co., Providence, R. I.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BOLTS AND NUTS
American Screw Co., Providence, R. I.
Clark Bros. Bolt Co., Milldale, Conn.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., New York City.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

BORING, DRILLING & MILLING MACHINES—Horizontal
Giddings & Lewis Machine Tool Co., Fond Du Lac, Wisc.
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond, Ind.
Universal Boring Mch. Co., Hudson, Mass.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond & Carbide Tools
Heald Machine Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING MACHINES—Precision
Cimatool Co., The, Dayton, Ohio.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

BRAKE LINING AND BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
Kiekhaefer Corp., Cedarburg, Wisc.

BRAKES—Electric & Mechanical
Clark Controller Co., The, Cleveland.
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic
Kiekhaefer Corp., Cedarburg, Wisc.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

BRAKES—Metal Forming
Bryant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The Steelweld Machinery Div., Wickliffe, Ohio.
Dreis & Krump Mfg. Co., Chicago.
Ferracute Machine Co., Bridgeton, N. J.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N.Y.
Illinois Clay Products Co., Joliet, Ill.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRIQUETS—Ferroalloy
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

BROACHES
American Broach & Machine Co., Ann Arbor, Mich.
Colonial Broach Co., Detroit.

BROACHING MACHINES
American Broach & Machine Co., Ann Arbor, Mich.
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ampco Metal, Inc., Milwaukee, Wisc.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BUCKETS—Clamshell
Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.
Cullen-Friestedt Co., 1303 S. Kilbourn Ave., Chicago.
Hayward Co., The, 50 Church St., N. Y. C.
Heyl & Patterson, Inc., Pittsburgh.
Industrial Brownhoist Corp., Bay City, Mich.
Wellman Engineering Co., The, Cleveland

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic
Packer Machine Co., The, Meriden, Conn.

BUFFING COMPOUND
Harrison & Co., Haverhill, Mass.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
American Rolling Mill Co., Middletown, Ohio.
Belmont Iron Works, Philadelphia.
Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.
Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Cleveland, Ohio.
Cleveland Crane & Engineering Co., The Steelweld Machinery Div., Wickliffe, Ohio.

BURNISHING MACHINES—Gear
Cimatool Co., The, Dayton, Ohio.

BURRING MACHINES
Acme Machinery Co., The, Cleveland.
Cimatool Co., The, Dayton, Ohio.

BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wisc.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.

BY-PRODUCTS COKE AND GAS PLANTS
Koppers Co., Engineering & Construction Div., Pittsburgh.

CABINETS—Tool & Parts
Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn, N. Y.

CABLE—Electric
General Electric Co., Schenectady, N. Y
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See Tramways

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CARBIC
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING—See Heat Treating

CARLOADERS
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Heyl & Patterson, Inc., Pittsburgh.

CASE HARDENING—See Heat Treating

CASTERS
Darnell Corp., Ltd., Long Beach, Calif.

CASTINGS—Acid or Heat Resisting
Ampco Metal, Inc., Milwaukee, Wisc.
Cramp Brass & Iron Foundries Co., Philadelphia.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Hoskins Mfg. Co., Detroit, Mich.
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Alloy Steel
Advance Foundry Co., The, Dayton, Ohio
Hartford (Conn.) Electric Steel Corp.
Mackintosh-Hemphill Co., Pittsburgh.
Michiana Products Corp., Michigan City, Ind.
National-Erie Corp., Erie, Pa.

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Brass, Bronze, Copper or Aluminum
Bunting Brass & Bronze Co., The, Toledo, Ohio.
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Cramp Brass & Iron Foundries Co., Philadelphia.
National Bearing Metals Corp., Pittsburgh.
Shenango-Penn Mold Co., Dover, Ohio.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Bronze
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

CASTINGS—Corrosion Resisting
Cramp Brass & Iron Foundries Co., Philadelphia.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Continental Roll & Steel Foundry Co., East Chicago, Ind.
Crucible Steel Castings Co., Lansdowne, Pa.
National-Erie Corp., Erie, Pa.

CASTINGS—Gray Iron
Advance Foundry Co., The, Dayton, Ohio.
American Engineering Co., Philadelphia.
Cramp Brass & Iron Foundries Co., Philadelphia.
Dodge Mfg. Corp., Mishawaka, Ind.
Kline Hardware Co., Allentown, Pa.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.
Lewistown (Pa.) Foundry & Machine Co.
Lobdell Car Wheel Co., Nazel Hammer Div., Wilmington, Del.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—High Test & Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Magnesium Alloys
Aluminum Co. of America, 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Canton (Ohio) Malleable Iron Co.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.
Northern Malleable Iron Co., St. Paul, Minn.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Manganese, Steel and Alloy
Pettibone Mulliken Corp., Chicago.

CASTINGS—Monel & Nickel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Semi-Steel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Steel
American Rolling Mill Co., Middletown, Ohio.
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Roll & Steel Foundry Co., East Chicago, Ind.
Crucible Steel Castings Co., Lansdowne, Pa.
Hartford (Conn.) Electric Steel Corp.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Michiana Products Corp., Michigan City, Ind.
National-Erie Corp., Erie, Pa.
Standard Steel Wks. Co., Phila., Pa.
Steel Founders' Society of America, Cleveland.
Strong Steel Foundry Co., Buffalo, N. Y.

CEMENT—Acid-Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CEMENT—Polishing Wheel
Harrison & Co., Haverhill, Mass.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Johns-Manville Corp., 22 East 40th St., New York City.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CENTERING MACHINES
Sundstrand Machine Tool Co., Rockford, Ill.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Silent
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAMFERING MACHINES (Gear)
Cimatool Co., The, Dayton, Ohio.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Rust Proofing
Alrose Chemical Co., Cranston, Providence, R. I.
Parker Rust Proof Co., 2186 Milwaukee Ave., Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Automatic
New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.
Potter & Johnston Machine Co., Pawtucket, R. I.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Magnetic
Brown & Sharpe Mfg. Co., Providence, R. I.
Heald Machine Co., Worcester, Mass.
Taft-Peirce Mfg. Co., The, Woonsocket, R.I.

CLAMPS FOR FIXTURES
Detroit (Mich.) Stamping Co.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Sales Co., The, Wyandotte, Mich.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (METAL)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLUTCH-BRAKES—Magnetic
Kiekhaefer Corp., Cedarburg, Wisc.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Foote Bros. Gear & Machine Co., 5301 H So. Western Blvd., Chicago, Ill.
Medart Co., The, St. Louis, Mo.

CLUTCHES—Friction
Dodge Mfg. Corp., Mishawaka, Ind.
Twin Disc Clutch Co., Racine, Wis.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., 727 Smith St., Milwaukee.
Kiekhaefer Corp., Cedarburg, Wisc.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Koppers Coal Co., The, Pittsburgh.
Pickands Mather & Co., Cleveland.
Sojuzugleexport, Kallaevskaja Ulitza 5, Moscow 6, U. S. S. R.

JUST BETWEEN US TWO

Road Agent at Large

The Japanese beetles of the publishing business are fraudulent subscription salesmen. Their prey is businessmen whose hearts are full of faith in their fellowmen. Subscriptions are offered at outrageously low prices, payment is made, and the rest is silence.

One of them, now operating in the Midwest, has a printed receipt form, bearing the words, "Western Publishers Service Corp.," and listing your favorite family journal along with *Fortune, Film Daily, Pencil Points* and *Architectural Record.* A victim tells us that the gentleman operating under this name is "slim built, about thirty years old, light complected, nose rather long, about 155 lb., five eleven or twelve high, very persuasive."

If he calls, hide.

Stoppers

Extracts from the ravings of a maniac!—*The Hall Planetary Co.*

20 Years at Hard Labor!—*Allis-Chalmers.*

And a 21-gun salute to Cincinnati Grinders, Inc., for that ad on page 55 of the July 27 issue, beginning, *"Dear Karl: Everything is fine and dandy here. My baby (machine) is sure going great . . .* " It's 100 per cent in reader interest and selling power.

They Do It the Hard Way

The South African member of the 18 immortals grumbles:

> "So Henry Leonard wants to know how it is some streets in England have odd and even numbers on the same side. Why, Britishers just detest standardization, a Yankee notion anyway, and think it is rather jolly to have the numbers start in on one side, proceed clear down to the end of the street and then come back on the other side. That is rugged individualism."

Don't look now but at least one street in New York City is similarly numbered, a prominent refractory engineer whispers.

Tsk! Tsk! Those English!

Another English whimsy, according to our informant, is to start numbering building floors one up from the street, and to number rooms consecutively, from bottom to top. Thus room 339, for instance, isn't necessarily on the third floor, which is the fourth.

The grand hotel, at the eastern tip of Long Island, where we spent our vacation, used a similar arrangement. We found it exciting trying to find the room where the cracked ice for the evening was to be melted, and were usually able to work up quite a thirst in the process.

History, First Hand

A Connecticut manufacturer of water wheels, who writes that he is 96, says floods have destroyed his dams, and wants to know if anybody can recommend a new site for his plant.

He remembers when Tyler was president, and the man who Polked him out—a wisecrack of the '40s. He recalls the efforts made by that rising young Congressman, Abraham Lincoln, to prevent the Mexican war, and the success of Zachary Taylor in ending it.

Four pages of it, single-spaced, with the country going to hell twice on every page. Made us feel young again.

Self Backpat

Back in the middle of June, when the steel industry was operating at 52½ per cent, C. E. ("Steve") Wright, our managing editor, stuck his neck out to the extent of predicting, in the *Summary of the Week,* that a peak of 60 per cent would be reached during the vacation months. Those in the know shook their heads dolefully like the maiden who warned the young mountain climber in "Excelsior."

But what happened? The steel industry has not only reached 60 per cent, but has passed it. Otherwise, we would not have brought this up.

Puzzles

Last week's little boy had 84 marbles.

Karl Wolfgang Friedrichs, of the Krupp plant in Essen, answers our plaintive cry for problems by forwarding this one told to him by an American bicycling through Germany.

> *A hunter erects a tent as a base for his operations. One day he leaves his tent and walks 3 miles south. Then he turns to the right and walks 5 miles west, where he sees a bear. He shoots the bear and drags it to his tent, which he reaches after having covered a distance of 3 miles. What was the color of the bear?*

Or if, when this reaches you, it is too warm to think, try this one, from what the English, who want gunners, call an "intelligence test" given to those who want to become gunners in the Naval Air Service:

> *Brown is sitting on the left of Robinson. Jones is sitting on the right of Robinson. Which of the three is in the middle?*

—A.H.D.

PRODUCTS INDEX

COAL, ORE & ASH HANDLING MACHINERY
Demag Corp., Duisburg, Germany
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Bdway., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Engineering & Construction Div., Pittsburgh.

COLD ROLL FORMING MACHINES
McKay Machine Co., The, Youngstown, Ohio.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

COMBUSTION CONTROLS
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.
Morgan Construction Co., Worcester, Mass.

COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Demag Corp., Duisburg, Germany
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Demag Corp., Duisburg, Germany
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONDENSERS—Surface & Jet
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTACTS—Electrical
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLLERS—Crane
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLS—Time Cycle
Koppers Co., Bartlett Hayward Div., Baltimore, Md.

CONVEYING AND ELEVATING MACHINERY
Farquhar, A. B., Co., Ltd., York, Pa.
Heyl & Patterson, Inc., Pittsburgh.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Farquhar, A. B., Co., Ltd., York, Pa.

COPING MACHINES
Cleveland (Ohio) Punch & Shear Works Co., The.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Penola, Inc., Pittsburgh.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 745 Central Ave., Pontiac, Mich.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Gairing Tool Co., Detroit
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Durant Mfg. Co., Milwaukee.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording
Durant Mfg. Co., Milwaukee.

COUNTING MACHINES
Durant Mfg. Co., Milwaukee.
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Cut-off Friction
Foote Bros. Gear & Machine Co., 5301 H So. Western Blvd., Chicago, Ill.

COUPLINGS—Flexible
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.
Poole Foundry & Mch. Co., Baltimore, Md.
Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
American Hoist & Derrick Co., St. Paul, Minn.
Cullen-Friestedt Co., 1303 S. Kilbourn Ave., Chicago.
Demag Corp., Duisburg, Germany
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES — Electric, Industrial, Truck Mounted
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Armel, James P., Pittsburgh.
Cleveland Tramrail Div. of The Cleveland Crane & Engrng. Co., Wickliffe, Ohio.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry
Demag Corp., Duisburg, Germany
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engrng. Co., Wickliffe, Ohio.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Jib
American Monorail Co., The, Cleveland.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

CRANES—Locomotive
American Hoist & Derrick Co., St. Paul, Minn.
Cullen-Friestedt Co., 1303 S. Kilbourn Ave., Chicago.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 West Pershing Road, Chicago, Ill.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable
Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.